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공학석사 학위논문

PERCEPTIONS AND USES OF
ONLINE INFORMATION SOURCES:
FOCUSING ON UNDERGRADUATE STUDENTS'
LEARNING ENVIRONMENTS

2013 년 8 월

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ABSTRACT

In the age of a society infused with digital technologies and information, the Millennial undergraduates who have grown up with the Web for their entire lives can easily and readily access a wide range of online information sources in relation to their needs in learning. However, in the vast amount of information available online, it is challenging to locate, evaluate, and select quality information that the students are looking for. Despite efforts in helping students to select the optimal sources for acquiring appropriate information for their learning, research indicates that students still often turn to the sources they prefer rather than those more suitable for their needs. In order to better understand and acknowledge the information seeking behaviour of undergraduate students in the Web environment, this study sought to explore the students' perception, use, and evaluation of online information sources for their learning.

Data were gathered using a mixed-methods approach: survey research followed by Web history log data collection with semi-structured diary. An online survey was administered to 189 undergraduates at Seoul National University in South Korea. Among the survey respondents, 25 students participated in the Web log data collection, where a total of 383 source visits related to learning were captured.

The results of data analysis reveal that the factors of accuracy and authority are taken most importantly in the selection of online information sources for learning, and the learning-related sources undergraduates perceive to be most accurate and authoritative are scholarly databases and library OPAC. It also reaffirms a strong preference on the easily accessible and usable information sources, such as domestic search portals and foreign search engines. It is discovered that the students are employing more contemporary sources, such as blogs and community sites as well in response to their information needs in learning. The participants' descriptions on their use of sources indicate that they do not only consider the ease of use and accessibility or the accuracy/authority when selecting online sources for learning but also expects to acquire diverse informational perspectives, visualized or simplified presentation of information, and word-of mouth information from the Web. Additionally, different types of information needs and seeking modes associated with learning tasks are identified from the data. Finally, the study confirms the discrepancy among the perceived values and the actual uses of online information sources in the context of learning.

The findings of this study explain how undergraduate students evaluate and perceive online information sources for learning, and how the students are using the Web to assist themselves with their learning-related needs. Such understanding of undergraduate students' use of various online

information sources in the context of learning will contribute to the improvement of information seeking of undergraduates for their learning in the Web environment.

Keywords: Online Information Source, Online Information Seeking, Learning, Undergraduate Students

Student Number: 2011-23989

1. INTRODUCTION

1.1 Background

The Millennial generation, who are also known as digital natives born during or after the introduction of the digital technologies, interacting with the Internet from an early childhood with a greater understanding of its concept, has come of age in a society infused with information (New Strategist Publications, 2001; Palfrey & Gasser, 2008). With massive information accessible through the Internet, the libraries are no longer the primary sources of information or knowledge for the Millennial (Porter, 2011; Griffiths & Brophy, 2005) who make up the majority of undergraduate students today. The Millennial undergraduates bring a unique set of information seeking characteristics and strategies as most of them have never known a world without the Web (New Strategist Publications, 2001; O'Brien & Symons, 2007). Many of them primarily use the Internet to address their learning-related information needs, and typically begin their information seeking processes with search engines which require less expertise than those of more authoritative sources such as online library IR systems (Currie, Devlin, Emde, & Graves, 2010; Griffiths & Brophy, 2005; Oblinger, 2005). They are often satisfied with the “good enough” results of what they find immediately in Google, but it is unclear how they determine the quality of information and sources to gather the information from, or even whether the

students take quality of information as a concern after all (Currie, Devlin, Emde, & Graves, 2010; Edwards, 2006; Taylor, 2012,). A richer and more coherent picture of the information behaviour of the Millennial can help reshape the information environment for the undergraduates (Holliday and Li, 2004) to better assist them with their information needs in the context of learning.

Furthermore, Prensky (2001) suggests that the Millennial undergraduates are not any more the students whom the traditional educational system is designed to teach. In the same vein, there is a growing interest in the latest generation of online information tools and sources, such as wikipedias, blogs and podcasts, as a way to enhance students' learning experiences and deepen the levels of learners' engagement in building knowledge through interaction on the Web (Armstrong & Georgas, 2006; Robertson, 2011; Oinas-Kukkonen, Lyytinen, & Yoo , 2010; Shih, 2010; Top, 2012). Learning has gone beyond the traditional printed materials toward a greater emphasis on collaboration with a greater sense of interaction and ownership of knowledge, supported by an effective use of electronic tools (Hsu, 2007).

This research takes a holistic approach to expand our understanding of undergraduates' extent of using the Web for learning. Undergraduates' information seeking behaviours and the future of the Web's role in

supporting their learning are topics of continuing concern for information researchers, educators, and practitioners. Researchers may use the findings to further develop a theoretical model of undergraduates' information seeking behaviours for learning in a Web environment. Educators may use the findings for helping the students better meet their needs of information using the Web. It is hoped that practitioners, such as providers of academic Web services, use the findings to assign priorities for implementing student-centred services that incorporate the substantial needs of the undergraduates and make the Web relevant and meaningful for the students' learning.

1.2 Research Goal and Objectives

The main **goal** of this research is:

To gain deeper understandings about undergraduate students' information seeking behaviours on the Web by investigating how they perceive and use online information sources in relation to their learning-associated information needs.

The research goal guides the formulation of a set of research objectives summarizing the purpose of this study and its implementation. The research objectives are as follows:

- a) To determine the undergraduate students' *perceptions* on online information sources in the context of learning

- b) To gain *empirical evidences of the realities* on the students' learning-related online information seeking behaviours and factors associated with it
- c) To determine *relations between the perceptions and the realities* as well as to develop a *picture of undergraduates' information ground* with regards to various learning-related online information sources

2. LITERATURE REVIEW

2.1 Information Seeking Behaviour

Information seeking behaviour has been extensively studied in a wide range of aspects such as information need initiation, information gathering, as well as information sharing and use in distinct disciplines or contexts (Bates, 1989; Case, 2002, 2006; Dervin, 1983, 1998; Ellis, Cox, & Hall, 1993; Krikelas, 1983; Pettigrew, Fidel & Bruce, 2001; Leckie, Pettigrew & Sylvain, 1996; Wilson, 1981, 1995, 2000; Whitmire, 2002). Individuals basically “need, seek, give, and use information in different contexts” (Pettigrew, Fidel & Bruce, 2001, p.44). Information seeking behaviour is defined generally as a purposive finding for information in response to the need to fulfill certain objectives oriented with work or personal interests (Krikelas, 1983; Leckie, Pettigrew & Sylvain, 1996; Wilson, 2000). Wilson’s *Information Behaviour Model* explains the information behaviour in three aspects (Figure 1).

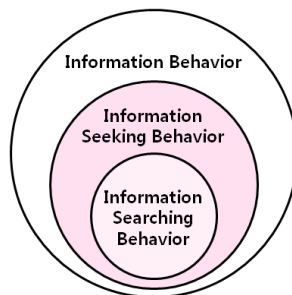


Figure 1. Wilson’s (2000) Information Behaviour Model

First, “information behaviour” is the totality of human behaviour in relation to information sources as a part of both active and passive information seeking and use.

Second, “information seeking behaviour” is the intentional seeking of information to discover and access information sources in an attempt to resolve an information need or to complete information-related goals.

Third, “information searching behaviour” is a subset of information seeking concerned with the searching for information in the information systems (Wilson, 2000).

2.1.1 Information Needs and Theoretical Models

Much research in information seeking implicitly focuses on information behaviours or activities associated with information needs, a lack of knowledge, or knowledge gaps (Krikelas, 1983; Nutefall & Ryder, 2010; Sonnenwald, Wildemuth, & Harmon, 2001; Wilson, 1999).

Information needs arise when an individual recognizes the absence of adequate knowledge to satisfy a goal that one may have or when there is “a gap that can be filled by something that the needing person calls ‘information’” (Case, 2002, p.70). Case’s explanation of information needs extracted from Brenda Dervin (1998) who defined information needs as a need to make sense of a current situation.

There are several well-known models dealing with elements which influence information seeking behaviour: Wilson's (1981, 1997, 1999) problem solving model, Ellis's (1989) behavioural model of information search strategies, Kuhlthau's (1991, 1999) model of the stages of information-seeking behaviour, and last but not least, Leckie, Pettigrew & Sylvain's (1996) model of information seeking behaviours of professionals.

Wilson's Model of Information Seeking Behaviour Wilson has developed a series of models that have been validated in the practice of information seeking research. Wilson's (1981) early model of information behaviour attempts to outline how information seeking behaviour occurs as a consequence of the user's need. To satisfy this need, the user creates demands upon formal or informal information sources or services, resulting in success or failure in locating related information (Wilson, 1981). The outcome demands direct success indicating the information is adequate for the needs, and is used to satisfy the needs or failures that are presumed to be the end of the process. Wilson's (1997, 1999) later models represent the context of information seeking behaviour. Furthermore, it distinguishes between different types of behaviour that motivate the search process: 1) *passive attention*, 2) *passive search*, 3) *active search*, and 4) *ongoing search* (Figure 2).

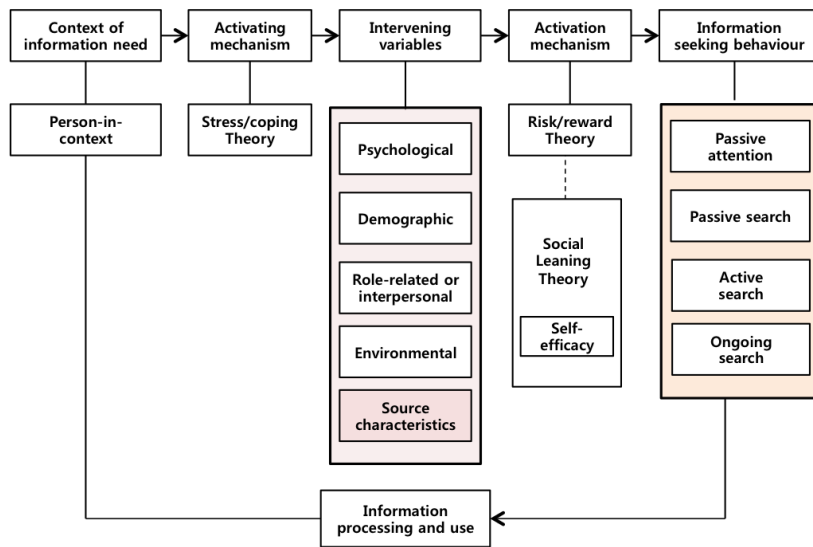


Figure 2. Wilson's (1999) Model of Information Seeking Behaviour

Ellis' Model Information Seeking Process Ellis (1989) explains the different behaviours concerning information using a set of stages and identifies different activities to illustrate the information seeking process.

Those activities are named and defined as following:

- *Starting*: Activating characteristics of the initial search for information.
- *Chaining*: Following chains of citations or other forms of referential connection between materials.
- *Browsing*: Semi-directed searching in an area of potential interest.
- *Differentiating*: Using differences between sources as filters on the nature and quality of material examined.
- *Monitoring*: Maintaining awareness of developments in the field through the monitoring of particular sources.

- *Extracting*: Systematically working through a particular source to locate material of interest.
- *Verifying*: Checking the accuracy of information
- *Ending*: Ending the search.

Ellis (1989) explains that an individual's information seeking behaviour is contingent on a specific time within those stages (Figure 3).

Kuhlthau's Model Information Search Process Kuhlthau's (1991) model of Information Search Process offers one comprehensive description of students' information seeking behaviour. Kuhlthau (1991) has done extensive investigation into the information seeking behaviour of students at various grade levels, and she discovered certain commonalities as the information process evolved, dividing the process into six stages:

1) Initiation, 2) Selection, 3) Exploration, 4) Formulation, 5) Collection, and 6) Presentation. Kuhlthau (1999) also identifies three realms of experience: Feelings (Affective), Thoughts (Cognitive), and Actions (Physical).

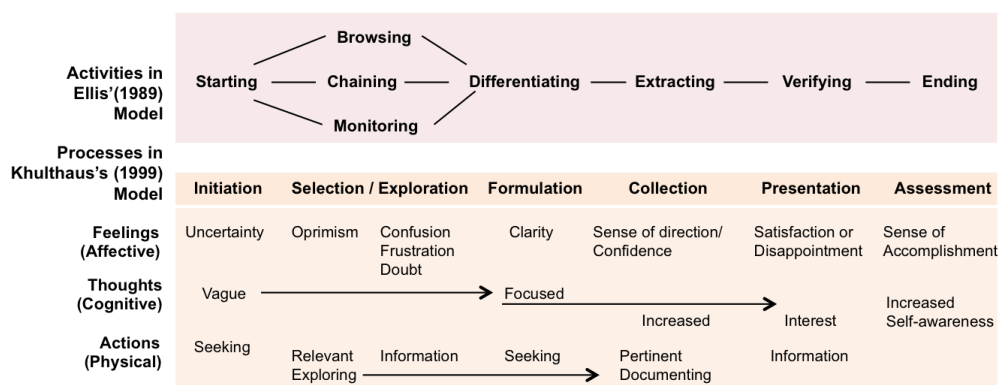


Figure 3. Kuhlthau's (1999) Model of ISP with Ellis' (1989) Model

to satisfy their needs. The model represents information seeking behaviour as information is sought, and the results of information seeking are outcomes, which influence other aspects of the model through feedback loops to sources, awareness, information sought (Figure 4).

Adoption of Theoretical Model Leckie, Pettigrew, & Sylvain's (1996) model has previously been adopted in various researches in Information Science. Researchers using this model to explore different professionals' information behaviors have found that it allows them to examine the behaviors in regard to important factors in them within the six elements of the model (Courtright, 2007; Foster, 2004; Spink, Park, & Cole, 2006). Specifically, the model has provided the framework for exploring the academic dimensions surrounding professionals' information-seeking behaviors with the model's six elements. For example, since this model illustrates information seeking behaviors of engineers, Kerins, Madden, & Fulton (2004) have adopted the model in their research on Information seeking of students studying for professional careers. Engel, Robbins, & Kulp (2011) also have used this model to design their research that studied information seeking behaviors of engineering faculty including the students. Furthermore, Leckie, Pettigrew, & Sylvain's (1996) model provides a methodology for examining professional values regarding information sources. Many researchers have adopted it to explore and discover how

professionals become aware of, select, use, or tend to use specific information sources. For example, research has found that lawyers and engineers tend to rely on informal sources such as their mentors and colleagues, personal knowledge, experience, and perceptions (Kerins, Madden, & Fulton, 2004; Pirolli & Card, 1999).

For such reasons, Leckie, Pettigrew, & Sylvain's (1996) model is selected among other models of information seeking behavior as a basis of the framework in this research for investigating the undergraduate students' perceptions and uses of online information sources in the context of learning.

2.1.2 Information Seeking on the Web

There are few in-depth studies which have examined overall information seeking behaviour on the Web. One of the most comprehensive studies was conducted by Choo, Detlor, & Turnbull (2000), who studied critical incidents of information seeking on the Web among 34 knowledge workers. Using interviews, questionnaires, and data logging over a 2-week period, significant episodes of information seeking were characterized as: *undirected viewing, conditioned viewing, informal search, and formal search*. Morrison, Pirolli, & Card (2001) studied significant Web actions through 2,188 responses to the 10th Gvu WWW user survey. Participants were asked to describe a recent episode in which they found information on the Web that led to a significant decision or action. The participants reported

four main goals: collect, find, explore, and monitor. Sellen, Murphy, & Shaw (2002) studied the Web activities of 24 knowledge workers over 2 days.

Participants were interviewed in front of their Web history pages at the end of the second day and described the different activities in which they engaged. Activities were classified into six main categories: finding, information gathering, browsing, transacting, communicating, and housekeeping.

Although these studies slightly differed in methodology and research goals, there are strong similarities among the resultant categorizations as shown in Table 1.

Table 1. Overview of Information Modes on the Web

Choo et al. (2000)	Morrison et al. (2001)	Sellen et al. (2002)
1 Informal Search	Find	Finding
2 Formal Search	Collect	Information gathering
3 Undirected Viewing	Explore	Browsing
4 Conditioned Viewing	Monitor	-
5 -	-	Transacting/Communicating/Housekeeping

The first is the short answer or informal search, including fact finding and simple lookup. In this category, the goal of the user is to retrieve some short, specific information, possibly on one page. The second category, the formal search, is the more traditional bibliographic search in which the user's goal is to collect enough information on a topic. This may require multiple pages and overlapping data for confirmation or alternating views on

the topic. The third category is the ludic notion of browsing, where the user is engaged in spontaneous information seeking. The fourth category is monitoring, which includes repeated visits to one or more Web pages to monitor or check for dynamic information. The final category consists of the remaining Web tasks which include non-information-seeking-related tasks such as transacting (e.g., online banking transactions), communicating (e.g., chat rooms and e-mails), and housekeeping (e.g., Web page maintenance).

2.2 Information Seeking Behaviour of Undergraduates

The information seeking environment of undergraduate students in relation to learning has as well been evolved as the technology continues to advance from almost-exclusively-library-based environment to the one with an increasing range of online tools and materials of multiple types.

It is no surprise that the undergraduate students of today whose world has never been without the Web take it as a primary source for information and communication (Porter, 2011; Griffiths & Brophy, 2005). Students' preference of the Web over other information sources is accompanied by less developed critical and strategic approaches to using information (Becker, 2003; Griffiths & Brophy, 2005; Brown, Murphy, & Nanny, 2003; Edwards, 2006; Head, 2007; Holliday & Li, 2004; Jones, 2002)

University students are the subjects of numerous studies of information seeking behaviour (Kuhlthau, 1991; Nutefall, & Ryder, 2010;

O'Brien, & Symons, 2005; Whitmire, 2004), as well with studies in Internet use behaviour (Griffiths & Brophy, 2005; McMillan & Morrison, 2006, Porter, 2011), information literacy (Bruce, 1997, 2002; Currie, Devlin, Emde, & Graves, 2010; Head, 2007; Maybee, 2006), and learning with web 2.0 (Lim, 2009; Head, & Eisenberg, 2010; Hsu, 2007; Shih, 2010)

Some of previous studies examined undergraduate students' use of one particular information source, such as Wikipedia (Lim, 2009; Head, & Eisenberg, 2010) or academic reference libraries (Fagan, 2003; Van Scoyoc & Cason, 2006), at the exclusion of other information sources. However, despite the changing information environment, most of prior studies excluded contemporary information sources of diverse formats (e.g. videos, blogs, e-books) or referred to sources generally as "print sources" and "online sources" (Dilevko & Gottlieb, 2002).

A segment of the research literature on undergraduate students' use of information sources investigated where undergraduates first turn when seeking information for their learning, and the main finding is that the Web search engines dominate undergraduates' information seeking practices (Currie, Devlin, Emde, & Graves, 2010; Griffiths & Brophy, 2005; Oblinger, 2005; O'Brien & Symons, 2005; Kim & Sin, 2007). Undergraduates in Griffiths and Brophy's (2005) study preferred Google more than using other sources to begin seeking information for academic purposes. An extensive

study (OCLC, 2005) conducted across six countries shows that over eighty percent of the university students sampled had used a search engine and email, with sixty three percent of them claiming to be familiar to extremely familiar with both. However, in comparison with these ‘popular’ sources, far fewer students claimed to have used more academic-oriented sources such as: library Web site (61%), electronic journals (58%), topic-specific Web sites (50%) and online database (34%).

Few studies have examined undergraduates’ use of more contemporary information sources, such as social network services, podcasts, or Google Scholar. Head (2007) reported that humanities and social sciences undergraduates sparingly used Wikipedia and dismissed blogs outright when seeking information for academic purposes out of concern for credibility and reliability. Lim’s (2009) study of undergraduate students who use Wikipedia when seeking information for school work found that 39.1% of the students were frequent users of Wikipedia (more than 15 times in an academic semester), compared to 61.2% of undergraduates who infrequently use the academic library’s online database (0-5 times in the academic semester). Head and Eisenberg’s (2010) study of undergraduates’ use of numerous information sources found that a smaller percentage of undergraduates use blogs (15%) while a majority consult Wikipedia (73%). Conversely,

Wikipedia was only used as an information source by 5.5% of the Korean undergraduates in Lee, Paik, & Joo's (2012) information source usage study.

2.3 Selection and Evaluation of Information Sources

2.3.1 Information Literacy

Information literacy is variously understood and defined. Lloyd (2006, p. 578) suggests that it "is a variable construct and is shaped and understood according to context". Information literacy research has close links to Information Science. (Bruce, 1997, 2002, 2008; Hughes, Bruce, & Edwards, 2007; Lupton, 2004; Eisenberg, 2010).

Information literacy is commonly associated with learning (Armstrong & Georgas, 2006; Bruce, 2008; Kuhlthau, 2005; Limberg, 2005), or the ways of knowing (Lloyd, 2006). Information literacy upheld as essential for personal empowerment and social and economic well-being in that it supports critical, social and political engagement (American Association of School Librarians, 1998; Lupton, 2004).

Information literacy, as a concept, first emerged with developing information technologies in the 1970s. Over the ensuing decades, information literacy has continued to evolve, responding to social and technological change. Its scope has widened from education, to corporate and community contexts (Bruce, 2008; Lupton, 2004; Virkus, Boekhorst, Gomez-Hernandez, Skov, & Webber, 2004).

Relational Model of Information Literacy Bruce's (2008, p. 5) definition of information literacy as "experiencing different ways of using information to learn" is underpinned by a relational model, as represented by the Seven Faces of Information Literacy (Bruce, 1997). It views information literacy as a complex of different ways associated with information. (Figure 5)

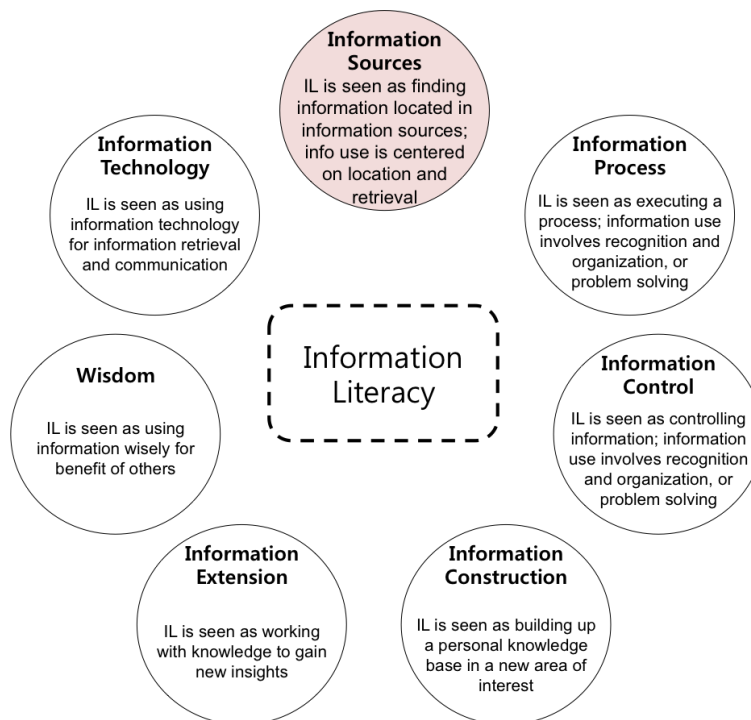


Figure 5. Bruce's (1997) Seven Faces of Information Literacy

Bruce (1997) states that although each face carries similar amount of significance, some of them are more complex than the others and reflect more sophisticated ways of using information. The second phase, which relates to the literacy regarding information sources, is one of the most

complex and significant factors directly influencing the ability to locate and retrieve the appropriate information in need.

2.3.2 Online Information Source

Information sources (e.g. a person, a book, a search engine, etc.) can generally defined as carriers of information (O'Reilly, 1982). Christensen and Bailey (1997) defines information source more specifically as a repository that can provide knowledge or information. The same content or information can be available from multiple sources, and a specific source can provide different types of information. (Agarwal, 2011)

Information sources can be generally categorized as follows (Agarwal, 2011; Rulke, Zaheer, & Anderson, 2000; Zimmer, Henry, & Butler, 2008):

- *(Inter)personal or relational or human* (i.e. colleagues, friends, supervisor, internal and external experts, etc.)
- *Impersonal or non-relational or non-human* (i.e. documents, manuals, journals, books, libraries, electronic repositories, digital libraries, Google search, etc.)

Agarwal (2011) has classified as the types of information sources in three dimensions of *1) interpersonal-impersonal*, *2) physical-electronic* and *3) synchronous-asynchronous* (Figure 6).

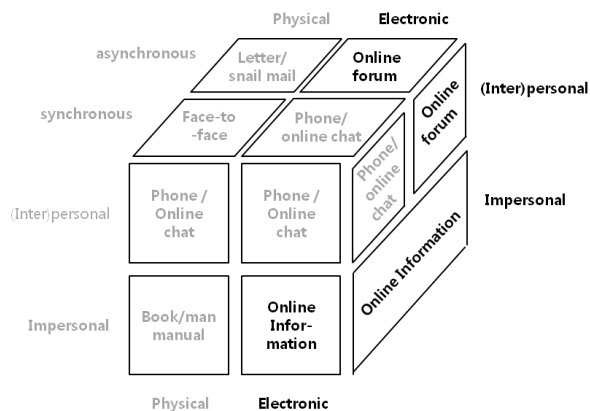


Figure 6. Agarwal's (2011) Classification of Source Types along Dimension and Areas to be studied in this Research

Studies of undergraduate students show that there are strong preferences for the electronic-asynchronous information sources over other types of sources (Becker, 2003; Dilevko & Gottlieb, 2002; Du & Evans, 2011). Some examples of information sources of particular type are search engines, professional Website, and online forums (Lee, Paik, & Joo, 2012).

2.3.3 Source Evaluation Criteria

Burton and Chadwick (2000) designed a survey and queried students regarding the criteria used when they evaluated sources on the Internet and in the library. Students in this study said that the most desirable source for them was a source that is easy to find, easy to access, easy to understand, and available when it is needed. They also placed a high value on up-to-date information, primary sources, reputation of the publication and the author, but they were not concerned about publisher reputation.

In a study on the source evaluation criteria identified by 13 undergraduate students, Twait (2005) found that students primarily valued the content of the source, but also ranked familiarity and availability as important. Very few students ranked reputation/credibility as important. Twait (2005) concluded that evaluation skills are lacking in and needed by undergraduate students.

Hung (2004) also investigated how undergraduates evaluated five Web pages using five evaluation criteria –authority, accuracy, objectivity, currency, and coverage. The study indicated that students usually employ only one or two criteria and use them repeatedly to evaluate all five Web sites. They evaluated Web sites superficially, even with the criteria spelled out for them. The five criteria, also widely known as ‘AAOCC’ criteria for evaluating electronic sources, are adapted from a checklist of criteria developed by Jim Kapoun (1998). Each criterion has a set of questions that the student answers to help determine if the website meets a particular criterion (Table 2).

**Table 2. Checklist of ‘AAOCC’ Criteria for evaluating electronic sources
(Science Libraries at UC Berkeley, 2012)**

Criterion	Checklist
Authority	<ul style="list-style-type: none"> • Who are the authors? Are they qualified? Are they credible? • With whom are they affiliated? Does their affiliation affect their credibility? • Who is the publisher? What is their reputation?
Accuracy	<ul style="list-style-type: none"> • Is the information accurate? Is it reliable and error-free? • Are the interpretations and implications reasonable? • Is there evidence to support conclusions? Is it verifiable? • Do the authors list their sources, references, or citations?
Objectivity	<ul style="list-style-type: none"> • What is the purpose? What do the authors want to accomplish? • Does this purpose affect the presentation? • Is there an implicit or explicit bias? • Is the information fact or opinion?
Currency	<ul style="list-style-type: none"> • Is the information current? Is it still valid? • Has it been superseded by subsequent research?
Coverage	<ul style="list-style-type: none"> • Is the information relevant to your topic and assignment? • Who is the intended audience? • Is the material presented at an appropriate level? • Is the information complete? Is it unique?

2.4 Summary of Literature Review

The literature outlined above contributes to the contextual depth to the study and draws attention to two key points about the undergraduate students’ perception and use of online information sources in the context of learning. In particular, it indicates that:

The undergraduate students’ learning environment is changing with the emergence of diversification in information sources on the Web.

The undergraduate students’ use of learning-related online information sources is highly associated with their needs in learning, and it also determines the modes of seeking.

The above points represent important considerations for the design and implementation of the study as well as the application of findings. It suggests the need for a flexible approach to information research, which is responsive to the current status of undergraduate students' learning in the Web environment, and the need to investigate their learning-related information needs and the possible impacts on the students' perception and use of online information sources in learning.

Consequently, the literature review leads towards the set of research questions developed and presented in the next chapter.

3. METHODOLOGY

3.1 Research Design

The overall objective of this research is to investigate multiple components of undergraduate students' perceptions and uses of online information sources for learning in order to gain a better understanding of undergraduates' online information seeking behaviour in the context of learning.

Mixed-methods approach is increasingly employed in studies related to information behaviour for attaining a comprehensive view of information users' multi-faceted behaviours (Caracelli & Greene, 1993; Fidel, 2008; Sonnenwald & Iivonen, 1999). The mixed-methods design is intended to take advantage of the strengths of both quantitative and qualitative methodologies (Axinn & Pearce, 2006) and to complement one method with another in order to enhance the validity of the results (Greene, Caracelli, & Graham, 1989; Johnson & Onwuegbuz, 2004). In the case of this research, both quantitative and qualitative methods are implemented collectively through a survey study followed by Web log data collection with semi-structured diary. The quantitative data from the survey and the Web log is used to determine the numbers related to the perceptions and actual uses of various online information sources, where the qualitative data from the diary entries is used to identify various factors associated with the behaviours to

explore meanings and subjective understandings of the quantitative findings. Moreover, the results from the quantitative analysis of survey data also refine the data collection instruments used to gather the qualitative data from the Web history logs and the diary entries.

Survey research is an established method for conveniently collecting data from a large population and for collecting data on aspects of behaviour that are difficult to observe directly (Babbie, 1990, 2012). However, a critical downside of sample survey is that respondents are studied outside the context of their information environments, and the level of realism can be vastly decreased.

In pursuance of greater realism, the Web history log collection is becoming an increasingly common research strategy for studying the user behaviour on the Web (Catlege & Pitkow, 1995; Choo, Detlor, & Turnbull, 2000; Keller, Watters, & Shepherd, 2007; Sellen, Murphy & Shaw, 2002). The primary strength of the history log data is that it can support the study by providing empirical evidences of users' interactions on the Web (Choo, Detlor, & Turnbull, 2000), and that it can amplify the authenticity, especially when the log is captured in the participants' own environments with their own tools, tasks and motivations.

Additionally, the entries of semi-structured diary provide complementary information to the data from the history log affording a

better understanding of the users' behaviours which cannot be fully explained only with the generic data captured from the history log. (Keller, Watters, & Shepherd, 2007).

3.2 Research Questions

In order to achieve the research goal of gaining a better understanding of undergraduates' online information seeking behaviour in the context of learning, this study addressed the following research questions:

1) Perceptions

RQ1. What are the **evaluation criteria** undergraduates identify as important in their selection of online information sources for learning?

RQ2. What are the undergraduates' **perceived quality and use** of various online information sources for learning?

2) Realities

RQ3. What are the **information needs** undergraduates encounter in learning-related tasks?

RQ4. What are the **seeking modes** undergraduates take in learning-related online information seeking?

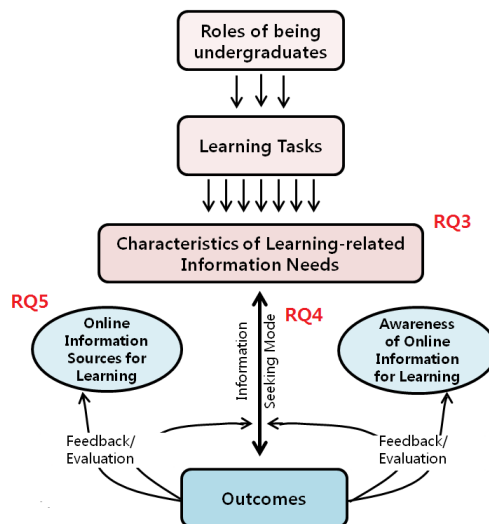
RQ5. What are the **online information sources undergraduates actually use** for different types of information needs and modes?

3) *Between the Perceptions and the Realities*

RQ6. What are the **relations among the undergraduates' perceived quality, perceived use and the actual use** of various learning-related online information sources for learning?

RQ7. How do the **information topography of the undergraduates** regarding various learning-related online information sources look in terms of perceived quality and the use?

3.3 Conceptual Framework



**Figure 7. The Modified Conceptual Framework
based on Leckie et al.'s (1996) Information Seeking Model**

In order to better address the research questions regarding the reality of the undergraduates' online information seeking in the context of learning, a conceptual framework of six elements is used in this research: 1) *Roles of*

being Undergraduates, 2) Learning Tasks, 3) Learning –related Information Needs, 4) Learning-related Online Information, 5) Learning-related Online Information Sources, and 6) Outcomes directly associated with the overall experiences of the online information seeking process (Figure 7). The six elements of this framework are built on the model of professional groups' information seeking developed by Leckie, Pettigrew, & Sylvain (1996), which has been discussed in the previous chapter. In order to form a more adequate structure, the concept of each element regarding the information seeking process was further modified to incorporate a new study group of undergraduates and the Web environment.

3.4 Data Collection

3.4.1 Sampling of Participants

The participants of the study were taken from the undergraduate students at Seoul National University (<http://www.snu.ac.kr/>) in the capital city, Seoul of South Korea. The university is made up of 16 colleges with 83 departments and approximately 16,710 undergraduate students. The list of colleges in Seoul National University is as follows:

- Humanities, Social Sciences, Natural Sciences, Nursing, Business Administration, Engineering, Agriculture and Life Sciences, Fine Arts, Law, Education, Human Ecology, Veterinary Medicine, Pharmacy, Music, Medicine, Liberal Studies

Three factors made a participant suited to represent the study target of the current research (i.e. full-time undergraduates who are accustomed to digital technologies and the Web in the context of learning). First, the participant must have accessibility to a shared or a personal desktop/laptop so that they are exposed to an environment for using Web information whenever in need for their learning. Also, one must claim to use the Internet for learning purposes at least for 30 minutes a day. Second, the participant's year of study must be higher than the first year as the freshman group who just entered the university may not have sufficient experiences of learning-related use of online sources, and thus their behaviours may be much different from those of the rest of undergraduate students. Third, the participant must be enrolled in at least 4 courses during the academic term in which data collection occurred to be counted as a full-time student.

3.4.2 Preliminary Study

Preliminary Study with three consecutive series of questionnaires was conducted to test the data collection instruments adopted from similar user study administrations described in the previous literature. 10 graduate students from the department of Digital Contents Convergence in Seoul National University and 10 undergraduate students from other universities in Seoul were recruited for the pilot study so as not to contaminate the participants for the main study.

The purpose of the preliminary study was not only to determine the amount of time needed to complete the survey, but also to check if there is any difficulty, confusion or incompleteness in the questionnaire or the experiment method. Modifications were made after each stage of the questionnaires accordingly. All questionnaires used in the preliminary study and the actual survey were in electronic format, and the Google Survey tool was used to develop them.

First Phase The first set of questionnaire was developed to identify the list of sites that the undergraduate students access in the context of learning. Participants were asked to go through the bookmark and the history pages of their Web browsers and record the address of 20 sites they usually access for learning purposes. The sites were then categorized according to the shape from Lee, Paik, & Joo's (2012) research, where the information source selection was studied in a similar setting with the current research (i.e. with Korean undergraduate students in academic search tasks). The categorization and the types of online information sources studied in this research are listed in Table 3.

Table 3. Online information sources studied in this research

Online Info. Source	Shortcodes	Example Sites
(Foreign) Search Engines	SE	e.g. Google Search (google.com)
(Domestic) Search Portals	SP	e.g. Naver (naver.com), Daum(daum.net)
Multimedia Content Services	MC	e.g. YouTube(youtube.com), ImageDB(44ikipe.org)
Scholarly Online Databases	SD	e.g. Google Scholar(scholar.google.com), JSTOR Academic DB(jstor.org)
Library OPAC (Online Public Access Catalog)	LO	e.g. SNU school library(library.snu.ac.kr); Korean National Library(nl.go.kr)
Wikipedia or Encyclopedia	WE	e.g. Wikipedia(wikipedia.org), Doosan Online Encyclopedia(doopeida.co.kr)
Open Lectures	OL	e.g. TED Talks(ted.com), MIT OpenCourseware(ocw.mit.edu)
Official Course Sites	CS	e.g. eTL(etl.snu.ac.kr) Blackboard Learn(blackboard.usc.edu)
Coursework Sharing Sites	SH	e.g. SlideShare(slideshare.net), Happy Campus(happycampus.com)
Online News/Magazine Sites	NE	e.g. The Korea Times(koreatimes.co.kr), CNET(cnet.com)
Community/Forum	CO	e.g. Apple Developer(devforums.apple.com), SNU Student Community(snulife.com)
Personal Blogs	BL	e.g. Blogspot(blogspot.com), Naver Blog(blog.naver.com)
Social Q&A Sevices	QA	e.g. Ask.com, KnowledgeIn(kin.naver.com)
Social Network Services	SN	e.g. Facebook facebook.com), LinkedIn(linkedin.com)

Second Phase In the second phase of the preliminary study, an experiment was designed to obtain two different sets of data: 1) the participant's *experience in general* with online information sources for learning: the evaluation criteria for selecting sources, the evaluation score of various information sources they use for learning; and 2) the *most recent three experiences* of completing learning-related tasks using online information sources: the topics of information they sought, the sources they accessed, and the degree of success they had in finding what they wanted. In order to

capture the data about the recent experiences, the experiment employed the Critical Incident Technique, which is a research method generally used to capture and identify behaviours occurring in specific critical situations that contribute to the success or failure in managing or overcoming the situations (Flanagan, 1954). The CIT has been widely adopted in this research area to help pinpoint users' experiences with difficulties in information seeking (Byrne, 2001; Tenopir & King, 2008; Urquhart, 2001). The second questionnaire was designed with open-ended questions asking the above-mentioned points (e.g. the topics of information they sought, the sources they accessed, etc.) regarding their most recent three incidents of learning-related online information seeking, such as finding the reference papers for a course assignment. In order to improve the accuracy of the data, participants were asked to refer to the history page of the Web browsers to assist them with their memories. A 20-minute long in-person or phone-call meeting was held with the participants to review their comments about the experiment and the questionnaire.

Most of the participants complained difficulties with the second part of the questionnaire where they had to describe about their recent experiences with learning-related online information seeking tasks. The participants claimed it troublesome having to check back and forth the history page and the inquiry page when completing the questionnaire. Indeed, many of them confessed

not having referred to the history page after all, and consequently, the self-reported data appeared to be inaccurate. As a result, the specific part of the questionnaire was removed, and it was decided to implement another experimental method (i.e. Web log data collection with semi-structured diary) to capture the students' experiences and behaviours of completing learning-related tasks using online information sources.

Third Phase In the third phase, which was conducted as a pilot test on the final version of the survey questionnaire, the participants were asked to record any concepts, phrases, and/or questions that were incomplete or unclear while completing the questionnaire. Most of the participants advised that some of the terminologies, such as 'authority' or 'coverage', were not commonly used, and it was unclear what those words were supposed to mean in the questionnaire. In order to reduce such confusion, all the concepts or terminologies that may seem unclear were defined exclusively and explained specifically in the context of this study.

3.4.3 Survey

The final version of the questionnaire was developed and administered electronically to the undergraduate students enrolled at Seoul National University to investigate their use of online information sources for learning, the criteria considered important for information source selection,

and their perception on various online sources. The elements of the survey questionnaire and the procedure for data collection are presented below.

Survey Questionnaire The final version of questionnaire is divided into four parts, and a brief description of each part of the questionnaire follows. The sample of the online survey can be found in Appendix A.

1. Demographic and Academic Backgrounds

The purpose of the questions in this part was to obtain data about demographic and academic backgrounds of the respondents. The questions obtained data on gender (Q1), college of school (Q2), and current term of study (Q3).

2. Web Environment and Usage

The purpose of the questions in this part was to identify the respondents' Web environment and the average amount of Web usage. The questions asked about the ownership of personal/shared computer or laptop (Q4), the average Web usage per day for general purposes (Q5), and the average Web usage per day for learning purposes (Q6).

3. Evaluation Criteria for Selecting Online Sources for Learning

The purpose of the questions in this part of the questionnaire was to identify the set of criteria the respondents consider important for evaluating sources for learning. Questions covered evaluation criteria considered important when selecting information sources for learning (Q8). The respondents were

asked to rate three of five ‘AAOCC’ evaluation criteria (e.g. authority, accuracy, objectivity, currency, coverage) (Kapoun, 1998), in order of importance. A complete and detailed explanation of each criterion was provided with the questions in order to reduce any confusion with the concepts.

4. Perceived Quality on Online Information Sources for Learning

The purpose of the questions in the last part was to determine the respondents’ perceptions on various online information sources for learning. The respondents were asked to indicate their perceptions on each of 14 pre-identified online information sources’ authority (Q9), accuracy (Q10), objectivity (Q11), currency (Q12), and coverage (13) on a 5-point Likert scale.

5. Perceived Use of Online Information Sources for Learning

The purpose of the questions in this part of the questionnaire was to determine the respondents’ perceived use of various online information sources for learning. Respondents were asked to indicate their perceptions on the use of each pre-identified online information source (Q7-1 to Q7-14). A 5-point Likert scale was used, with response options as follows: 1(not used at all), 2(not used much), 3(somewhat used), 4(used frequently), 5(used very frequently). The data collected from the survey are summarized in Table 4.

Table 4. Summary of Data Collected from Survey

DEMOGRAPHIC AND ACADEMIC BACKGROUNDS	gender	college (by faculty)	current term of study			
	Q1	Q2	Q3			
WEB ENVIRONMENT AND USAGE	ownership of laptop/desktop	primarily-used Web browsers	avg usage per day for general purposes	avg usage per day for learning purposes		
	Q4	Q5	Q6	Q7		
EVALUATION CRITERIA FOR SOURCE SELECTION	importance of authority in source selection	importance of accuracy in source selection	importance of objectivity in source selection	importance of currency in source selection	importance of coverage in source selection	
	Q8-1	Q8-2	Q8-3	Q8-4	Q8-5	
PERCEPTIONS ON ONLINE INFORMATION SOURCES	perceived authority	perceived accuracy	perceived objectivity	perceived currency	perceived coverage	PERCEIVED USE OF SOURCES
Search engines	Q9-1	Q10-1	Q11-1	Q12-1	Q13-1	Q14-1
Search portals	Q9-2	Q10-2	Q11-2	Q12-2	Q13-2	Q14-2
Multimedia Services	Q9-3	Q10-3	Q11-3	Q12-3	Q13-3	Q14-3
Scholarly DB	Q9-4	Q10-4	Q11-4	Q12-4	Q13-4	Q14-4
Library OPAC	Q9-5	Q10-5	Q11-5	Q12-5	Q13-5	Q14-5
Wikipedia or Encyclopedia	Q9-6	Q10-6	Q11-6	Q12-6	Q13-6	Q14-6
Official Course Sites	Q9-7	Q10-7	Q11-7	Q12-7	Q13-7	Q14-7
Open Lectures	Q9-8	Q10-8	Q11-8	Q12-8	Q13-8	Q14-8
Coursework Sharing Sites	Q9-9	Q10-9	Q11-9	Q12-9	Q13-9	Q14-9
News/Magazine Sites	Q9-10	Q10-10	Q11-10	Q12-10	Q13-10	Q14-10
Community/Forum	Q9-11	Q10-11	Q11-11	Q12-11	Q13-11	Q14-11
Blogs	Q9-12	Q10-12	Q11-12	Q12-12	Q13-12	Q14-12
Social Q&A Services	Q9-13	Q10-13	Q11-13	Q12-13	Q13-13	Q14-13
SNS	Q9-14	Q10-14	Q11-14	Q12-14	Q13-14	Q14-14

Survey Administration A solicitation message to recruit participants was prepared by the researcher and posted in the university's most popular community site (<http://www.snulife.com>). The site is only accessible to the users who have authenticated themselves as a member of Seoul National

University, and it is where the undergraduate and graduate students of the school share and get a wide variety of information from academic or living-related ones to time-killing ones like jokes or funny pictures. The solicitation message described the current research's purpose briefly, included a link to the electronic questionnaire, provided an estimated time for completion, and explained the confidentiality of the responses.

The electronic questionnaire was self-administered, and the respondents were self-selected. To facilitate students' participations, respondents who completed the questionnaire were directed to submit their email address for entry into a prize drawing for a chance to win one of ten \$5 coupons for coffee, five \$10 coupons for burger, or a \$20 coupon for movies.

Background Information of Survey Respondents A total of 189 undergraduate students from Seoul National University have responded to the online questionnaire for three weeks from May 17, 2013 to June 7, 2013. Table 5 tabulates the demographic information as well as the academic backgrounds and the Web usage of the respondents gleaned from Q1 to Q6 of the survey questionnaire. The result shows that the number of males (52%) and females (48%) are almost balanced. The survey respondents have diverse academic backgrounds: Humanities (9%), Social Sciences (11%), Business Administration (13%), Law (12%), Education (3%), Human Ecology (2%), Natural Sciences (5%), Engineering (18%), Agriculture and

Life Sciences (17%), Nursing (5%), Pharmacy (2%), Fin Arts (3%), and Music (3%). The number of undergraduate students with soft disciplinary background (49%) and the number of students with hard disciplinary background (46%) are balanced as well. 33% of the respondents are undergraduates in their 2nd year, 34% are in their 3rd, and 33% are in their 4th year of study.

Most (89%) of the survey respondents owned either or both a personal laptop or/and a personal desktop. This exclusive result may be due to the fact that the solicitation message for recruiting participants indicated that the research is preferably looking for a personal laptop/desktop owner for the purpose of the Web log data collection. 72% of the respondents were Internet Explorer Users, where 47% of them (i.e. 34% of entire respondents) use IE only. 24% of the respondents were Chrome-only users, and 35% indicates both IE and Chrome as their primarily-used Web browsers.

With regards to the general Web usage, 32% of the respondents reported using the Web for more than 3 hours per day, 38% use the Web for 2 to 3 hours a day, and 31% of them use the Web for 1 to 2 hours a day; none of the respondents report that their Web usage is less than 1 hour. More specifically for the Web usage in the context of learning, 17% of the respondents claim to use the Web for learning at least for 2 hours a day, 32% report their Web usage for learning is between 1 hour to 2 hours a day, 49% of the

respondents' Web usage for learning is between 30 minutes to an hour per day, and the rest (3%) use the Web for less than 30 minutes with learning purposes.

Table 5. Background information of survey respondents (N=189)

	Item	Frequency	Percentage	Note
Gender	Male	98	51.9%	
	Female	91	48.1%	
College of School	Humanities	17	9.0%	
	Social Sciences	20	10.6%	
	Business	24	12.7%	Soft Discipline (49.2%)
	Administration			
	Law	22	11.6%	
	Education	6	3.2%	
	Human Ecology	3	1.6%	
	Natural Sciences	9	4.8%	
	Engineering	33	17.5%	Hard Discipline (45.5%)
	Agriculture and Life Sciences	32	16.9%	
	Nursing	9	4.8%	
	Pharmacy	3	1.6%	
	Fine Arts	5	2.6%	Arts/Music (5.3%)
	Music	6	3.2%	
Year of Study	2nd year	63	33.3%	
	3rd year	64	33.9%	
	4th year	62	32.8%	
Ownership of Computer	only PL	83	43.9%	
	only PD	25	13.2%	
	only SL	4	2.1%	
	only SD	4	2.1%	
	Both PL+PD	13	6.9%	
	PL with SL/SD	42	22.2%	
Primarily-used Web Browser	PD with SL/SD	18	9.5%	
	only IE	64	33.9%	
	only Chrome	45	23.8%	
	IE+Chrome	72	38.1%	
Average Web Usage in General	Chrome+Safari	8	4.2%	
	1-2 hours	58	30.7%	
	2-3 hours	71	37.6%	
	>3 hours	60	31.7%	
Average Web Usage for Learning	<30 mins	5	2.6%	
	30 mins -1 hour	92	48.7%	
	1-2 hours	60	31.7%	
	>2 hours	32	16.9%	

3.4.4 Web History Log with Semi-structured Diary

With the aid of the survey questionnaire, participants who claimed to be involved in learning-related Web use for more than 1 hour per day, and who reported to own a personal desktop/laptop were selected for the purpose of the second phase of the data collection – a one-week long Web history log collection with semi-structured diary. Students with high involvement of learning-related Web use was selected to produce rich data; and the ones with personal desktop/laptop were targeted because an installation of custom software was mandatory. The participants of the data collection were rewarded \$20 for providing their Web history logs and completing the diary entries for the participation period of one week.

Capturing Web History Log The participants who met the requirements were contacted by email with an instruction guiding them to install ‘BrowsingHiwrtoryView.exe’ – custom software for capturing the history log of Web browsers. The particular software was chosen for its ability to capture history data of all Web browsers together since some of the participants in the preliminary study claimed that they use two or more browsers interchangeably, and their learning-related information seeking tasks occur in both browsers. Also, the software allowed users to selectively delete some of the logs. The participants were given an option to remove any data that they do not wish to share with the researcher so that participants

could work on the Web as they normally would without any concerns of privacy issues.

Specifically, the software captured the following data of visited Web pages: *URL addresses, titles, visit times, visit counts, page it was redirected from, Web browser used to access the page* (Figure 8).













URL	Title	Visit Time	Vis...	Visited From	Web Browser	U..
 http://library.snu.ac.k...	Seoul Nat'l University Li...	2013-07-07 오후 5:...	1		Chrome	O..
 http://library.snu.ac.k...	서울대학교 중앙도서관 ...	2013-07-07 오후 5:...	3		Chrome	O..
 http://my.snu.ac.kr/...		2013-07-07 오후 4:...	1		Internet Exp...	O..
 http://my.snu.ac.kr/...		2013-07-07 오후 4:...	2		Internet Exp...	O..
 http://www.koreartne...	옛날에는 어떻게 살았을...	2013-07-07 오후 4:...	1	https://www....	Chrome	O..
 https://www.google.c...	옛날에는 어떻게 살았을...	2013-07-07 오후 4:...	2	https://www....	Chrome	O..
 https://www.google.c...	Google	2013-07-07 오후 4:...	4		Chrome	O..
 http://blog.daum.net...		2013-07-07 오후 4:...	2		Chrome	O..
 http://blog.daum.net...	하늘바람yeon2	2013-07-07 오후 4:...	1	https://www....	Chrome	O..
 https://www.google.c...	Google	2013-07-07 오후 4:...	4		Chrome	O..
 http://blog.daum.net...	조선시대 왕의 명칭에서...	2013-07-07 오후 4:...	1		Chrome	O..
 https://www.google.c...	Google	2013-07-07 오후 4:...	4	https://www....	Chrome	O..

Figure 8. An example of Web history log recorded by the software

Recording Semi-structured Diary The participants were asked to copy the data from the software and paste them into a Google Drive Excel sheet, which was synchronously shared with the researcher, at the end of each day for the participation period of a week. Although the Web history log data captured by the software provides some generic information about the web activities of the participants, a complementary data with more detailed descriptions was required to better understand the participants' information seeking behaviours on the Web. Accordingly, participants were asked to fill in the five entries to describe their web activities: *Category of the learning task, category of the information needs, detailed description of the information needs, the satisfaction rate of the particular web activity upon*

task completion and the reason for the rate. Students were given with the choices for the categorization of tasks and information needs, pre-identified from the literature review and the preliminary study. However, they were invited to come up with a new category if they think that none of the given options would reflect their learning tasks or information needs precisely.

(Figure 9)

URL	Title	v v v v v F browser	Ur Pi 학습 분류	세부 목적	세부 설명	정보 요구 만족도	만족도 이유
http://127.0.0.1:85lang=eng&country		Internet 1 Explorer	Ar				
		2 Chrome	Ar				
http://blog.naver.com/blogid=hyperion37	조선시대 왕 '조'와 '중'의 차이점 :: 네이버 블로그	2 Chrome	Ar 글				세종대왕 호칭의 이유에 대해 확실히 알게됨
http://blog.naver.com/blogid=wooseokin	조선시대 왕계보에서 '조'와 '중'의 차이 :: 네이버 블로그	1 Chrome	Ar				
http://www.google.sa=t&rl=j&q=%E1UYbWOqTziAFT24g&bvm=bv.4700		1 Chrome	Ar				
http://www.google.ab&q=%EC%A1%ab.KGVNOPPWV	조선왕조 조 중 차이 - Google Search	1 Chrome	Ar 수업	예/복습	한국사 수업에서 "조선왕조 왕들의 호칭에 나타난 조와 중의 의미"에 대해 배웠는데 세종대왕은 왜 "중"이라는 호칭을 받게 되었는지 궁금해서 검색		

Figure 9. An example of a Google Drive Excel sheet with the history log data and diary entries recorded

The data collected from the web history logs and the self-generated diaries were then coded according to the coding scheme prepared with parameters from previous works. The activities were divided by the task session, where the term ‘session’ is used to represent a period of continuous Web usage, annotated with the same task and information needs, with no break in usage greater than 25.5 min. ‘Web task session’ is generally defined as a period of continuous Web usage, and Catledge and Pitkow’s (1995) definition of a session as a period of continuous Web usage with no break is usage greater than 25.5 minutes has been widely accepted in the study of

user behaviour on the Web (Montgomery and Faloutsos, 2001; Kellar, Watters, and Shepard, 2007). In a more recent study of search engine transaction logs, Jansen and Spink (2003) measured session duration from the time the first query was submitted to the search engine until the user quit the search engine. It was reported that 52% of all sessions lasted less than 15 minutes.

Background Information of Log Collection Participants The background information of 25 undergraduate students who have participated in the Web history log collection is summarized in Table 6.

Table 6. Background information of participants of web history log collection (N=25)

	Item	Frequency	Percentage	Note
Gender	Male	12	48.0%	
	Female	13	52.0%	
College of School	Humanities	3	12.0%	Soft Discipline (40.0%)
	Social Sciences	2	8.0%	
	Business	2	8.0%	
	Administration			
	Law	3	12.0%	Hard Discipline (52.0%)
	Natural Sciences	2	8.0%	
	Engineering	6	24.0%	
	Agriculture and Life Sciences	3	12.0%	
	Nursing	1	4.0%	
	Pharmacy	1	4.0%	
	Fine Arts	2	8.0%	Arts/Music (8.0%)
Year of Study	2nd year	8	32.0%	
	3rd year	6	24.0%	
	4th year	11	44.0%	
Average Web Usage in General	1-2 hours	9	36.0%	
	2-3 hours	9	36.0%	
	>3 hours	7	28.0%	
Average Web Usage for Learning	30 mins -1 hour	15	60.0%	
	1-2 hours	4	16.0%	
	>2 hours	6	24.0%	

The recruitment of participants was designed to selectively balance the number of male (52%) and female (48%) participants. Ten of the participants (40%) were undergraduates with soft disciplinary backgrounds, while thirteen (52%) were from hard disciplinary and the rest (8%) of them were majoring in Fine Arts. More than 70% of the students claimed their general Web usage per day to be more than 2 hours, and 60% of the participants indicated their typical Web usage for learning purpose to be between 30 minutes to an hour per day.

3.5 Data Analysis

Both quantitative and qualitative analyses are conducted collectively and complementarily in alignment with the mixed-methods approach of the research design.

Quantitative analysis of data collected from the survey questionnaire and the Web history logs provide descriptive statistics about the undergraduates' information behaviours in relation to learning, and the Statistical Package for the Social Sciences (SPSS) is used to conduct the statistical analysis of the data. The descriptive statistic measure of central tendency and the measure of variability were primarily used to analyze the quantitative data, and the Pearson Product Moment Correlations with the Multidimensional Scaling analysis based on the Euclidean distance method

was used to determine the relations between the perceptions and the uses of different sources.

Qualitative data collected from the entries of semi-structured diary yielded an elaborated description and understanding of the quantitative results. Additionally, both inductive and deductive reasoning were used to analyze the qualitative data acquired from the diary entries. The entries were analyzed using a deductive coding scheme derived from literature review in the beginning, and the coding scheme was inductively refined over time based on the collected data describing the characteristics and factors related to the undergraduates' online information seeking behaviours and selection of sources in the context of learning. The coded data were then grouped into categories to recognize important themes and patterns as they emerged.

4. RESULTS

The goal of this research is *to develop an in-depth understanding of undergraduate students' information seeking behaviours in the context of learning* by addressing the research questions outlined in the previous chapter. The quantitative and qualitative results of the study are divided and presented in three sections in accordance with the approaching research question.

The first section presents the results of the survey addressing the research questions regarding the undergraduates' perceptions about online information sources in the context of learning. A quantitative data analysis for the close-ended questions reveals the evaluation criteria the undergraduates' value for selecting learning-related online information sources (RQ1), their perceived quality and use of various sources for learning (RQ2). The main purpose of this section is to provide descriptive information for a preliminary understanding of the investigated phenomenon.

The second section discusses the results of the Web history logs and the complementary semi-structured diaries to address the research questions regarding the reality of online information sources used for learning. The data provide information on different components such as information needs (RQ3), and seeking modes (RQ4) that undergraduate students encounter in the context of learning to determine the behavioural characteristics of their

learning-related online information seeking tasks. Furthermore, the online information sources undergraduates actually use for different types of information needs and seeking modes (RQ5) are identified.

Finally, the third part mainly contributes to determining the relations among the undergraduates' perceived quality, perceived use and the actual use of various online information sources for learning (RQ6), and creating the topographical map of information sources in terms of perceived quality and the use (RQ7).

4.1 Perceptions on Online Information Sources for Learning

The survey responses were collected from 189 undergraduates from Seoul National University, and the results of the survey study address the research questions regarding the undergraduates' perceptions on the quality and use of online information sources in the context of learning.

4.1.1 Evaluation Criteria for Selecting Online Sources for Learning

A summary of respondents' ratings on the importance of five evaluation criteria in the selection of online information sources for learning is presented in the left section of Table 7, where the importance of each criterion is rated with the maximum score of 3. Respondents consider "Accuracy" as the most importance criteria, followed by "Authority" and "Objectivity".

Table 7. Correlation analysis among evaluation criteria

	Importance Rate (max=3)		Inter-construct Correlations				
	Mean	SD	1	2	3	4	5
1. Authority	1.28	1.247	1				
2. Accuracy	2.19	1.103	.410**	1			
3. Objectivity	1.01	.984	.163*	.335**	1		
4. Currency	.86	.807	-.480**	-.127	.049	1	
5. Coverage	.66	1.011	.245**	.158*	.445**	-.116	1

(*p<0.05, **p<0.01)

The study further examines the relationships between the five factors of evaluation criteria. It presents a correlation analysis results based on Person r coefficients. The results reveal that the factor of authority is moderately associated with those of accuracy and coverage ($r = .410$ and $.245$, respectively at the 0.01 alpha level), and negatively related with that of currency ($r = -.480$ at the 0.01 alpha level). In other words, respondents who consider authority as an important factor for selecting online information sources also consider the factors of accuracy and coverage important, but care relevantly less about the currency of the sources.

4.1.2 Perceived Quality of Online Information Sources for Learning

Perceptions of undergraduate students on various online information sources in relation to the five evaluation criteria are analyzed. As for the authority of the sources, scholarly online databases (4.60) and library OPAC (4.75) are perceived to be the most authoritative ones for learning. It is noticeable that the authority of course sites (3.96) is rated relatively high as it

is where the students can obtain the pieces of information and resources that are officially uploaded by the professors.

Table 8. *Perceptions on authority, accuracy, objectivity, currency and coverage of various online information sources*

	Perceived authority		Perceived accuracy		Perceived objectivity		Perceived currency		Perceived coverage	
	M	SD	M	SD	M	SD	M	SD	M	SD
Search engines	3.29	0.88	3.74	0.82	3.38	0.73	4.45	0.62	4.52	0.59
Search portals	2.68	0.86	3.29	1.10	2.98	0.81	4.33	0.86	4.06	1.01
Multimedia Services	2.54	0.75	2.90	0.97	3.04	1.01	4.06	0.79	4.23	0.89
Scholarly DB	4.60	0.64	4.61	0.66	4.48	0.59	3.53	0.90	3.31	0.93
Library OPAC	4.75	0.48	4.58	0.63	4.61	0.49	3.23	0.83	3.35	1.00
Wikipedia or Encyclopedia	3.60	0.84	3.79	1.00	3.63	1.14	3.51	1.02	4.16	0.84
Official Course Sites	3.96	0.98	3.69	1.09	3.78	1.11	3.05	1.13	3.16	1.32
Open Lectures	3.49	1.12	3.16	1.13	3.10	0.87	3.32	0.84	3.15	1.12
Coursework Sharing Sites	1.85	0.94	2.29	1.13	1.99	0.87	2.49	0.98	1.67	0.99
News/Magazine Sites	2.64	1.05	2.60	1.00	2.05	0.89	4.32	0.91	3.65	0.99
Community/Forum	1.90	0.82	1.90	0.81	1.81	0.79	3.36	0.96	2.83	1.15
Blogs	2.35	0.93	2.36	1.00	1.89	0.88	3.23	1.03	3.01	1.10
Social Q&A Services	1.63	0.79	1.95	0.90	1.77	0.75	3.20	1.05	3.13	1.25
Social Network Services	1.77	0.70	1.89	0.86	1.46	0.64	4.14	1.00	3.44	1.23

(High-rated coloured in red; low-rated coloured in blue)

On the contrary, Social Q&A Services (1.63), Social Network Services (1.77), and Coursework Sharing Sites (1.85) are rated the lowest in terms of authority. Participants tend to undervalue those sources in which the publisher or the primary origin of the information is unclear. Participant H12,

a Life Science student, indicated a concern regarding information she encountered on the Web.

“I found this interesting piece of article on the social Q&A site, but I am not sure whether the information is really reliable because the primary source of the information is not identified clearly.”

Scholarly online databases and library OPAC are also perceived to be most accurate and objective with rates over 4.50. On the other hand, perceived accuracy and objectivity of social Q&A services, social network services, and coursework sharing sites are all rated low again with scores under 2.00. It is remarkable that community sites and blogs received low scores for objectivity as they are perceived to be places where users post their own thoughts and opinions freely.

In regards with the currency and the coverage of sources, search engines, search portals, and multimedia content services are rated high with scores over 4.00. Interestingly, news/magazine sites (4.32) and social network services (4.14) are perceived to be highly current despite that they indeed score much lower for other factors of evaluation criteria. Social network services are clearly where the undergraduate students tend to visit for obtaining information on the latest news and updates. At any rate, as far as the currency and coverage are concerned, the online information sources all received relatively high scores, with most of them higher than 3.00.

4.1.3 Perceived Use of Online Information Sources for Learning

Figure 10 presents perceived use of various online sources in the process of learning-related information seeking, self-reported by respondents of the survey. A 5-point Likert scale was used, with response options as follows: 1(not used at all), 2(not used much), 3(somewhat used), 4(used frequently), 5(used very frequently).

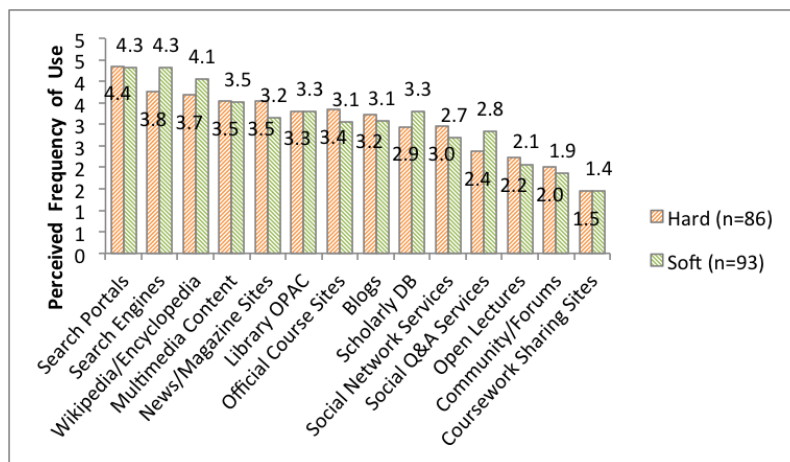


Figure 10. Perceived Use of Online Information Source by Discipline

Domestic Search Portals (4.34), such as Naver, appears to be perceived as the most frequently used sources of information, followed by Foreign Search Engines (4.04), such as Google. Although the two distinctively identified sources are very similar in nature that they both provide the same kind of information searching services, the two have a significant difference in that the foreign search engines focus primarily on the retrieval of Web documents, such as Web pages, images and videos

based on the queries entered by the users, whereas the domestic search portals provide more variety of services, such as keywords in issue, shopping channels, and informative articles customized for each user. Many of the participants indicated the ease of use and accessibility as reasons for their preferences on search portals. Participant H03, an Engineering student, stated:

“What I like about the portal is that it brings up all these facts, images, and news articles about the person once I enter his name on the search box. It’s convenient.”

On the other hand, some participants expressed difficulties with language barrier they encounter in the foreign search engines. Participant S02, a Business student, explains his frustrations with foreign search engines.

“I know that there are some high-quality information and sources in foreign sites and I would be able to easily find them on Google, but it is stressful for me to see and understand those in English. I’d rather go with Naver even though it may not give me the best results.”

Respondents reported a high use of Wikipedia (3.87), Multimedia Content Services (3.53), and News/Magazine Sites (3.16) in association with learning. The Coursework Sharing Sites (1.45), Community/Forum (1.94), and Open Lectures (2.15) appear to be the sources perceived to be least used in the context of learning.

These reported frequencies of use of the online information sources differ considerably with the frequencies of use captured in the history log, which will be presented and explained in the later section in further detail.

Table 9 indicates those types of information sources that are used differently among the undergraduate students with different disciplinary backgrounds. Among 14 online information sources tested in the survey research, the t-test found that use of 5 sources varied significantly by discipline. Much higher use of search engines is observed with the undergraduate students who have a hard disciplinary background. The use of scholarly DB, Wikipedia/encyclopaedia, and social Q&A services appear higher with the students in the hard disciplines. On the other hand, a higher percentage of respondents in the soft disciplines consulted more with news/magazine sites than those in the hard disciplines.

Table 9. *Types of information sources that are used differently among undergraduates with soft/hard disciplinary backgrounds*

Discipline	Mean (max=5)		SD		t value	sig. (p value)
	Soft (n=93)	Hard (n=86)	Soft	Hard		
Use of Search Engines	3.75	4.33	.917	.583	-4.944	.000**
Use of Scholarly DB	2.95	3.30	.971	1.075	-2.329	.021*
Use of Wikipedia/Encyclopedia	3.68	4.06	.969	.962	-2.636	.009*
Use of News/Magazine Sites	3.55	3.16	1.006	1.235	2.298	.023*
Use of Social Q&A Services	2.38	2.84	1.031	1.177	-2.792	.006*

(*p<0.05, **p<0.01)

4.2 Realities on Online Information Sources for Learning

A total of 25 undergraduates from the survey respondents were selected for the follow-up experiment for collection of Web history logs with semi-structured diaries. The log data consists of 198 sessions in total, where the session is defined as a period of continuous Web usage, described with the same tasks and information needs, with no break in usage greater than 25.5 minutes. During the 1-week of collection period, a total of 7873 web pages were visited, where 1467 of them were identified as associated with learning. By considering a series of visits to the pages with the same URL as a single source visit, a total of 383 source visits were counted during the collection period. The data address the research questions regarding the reality of online information sources used for learning and some factors associated with the behaviours. Descriptive statistics are used due to the sample size and the exploratory nature of the study.

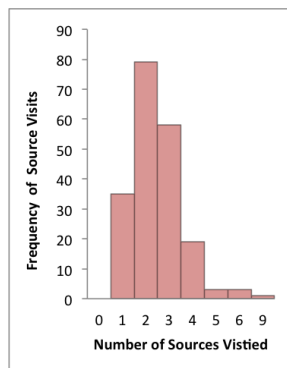


Figure 11. Number of Different Types of Sources Visited during a Session

On average, students spent 6.76 minutes on the observed learning-related online information seeking activities, and employed 2.45 different sources on average in each session. The range of number of sources selected was between one and nine (Figure 11).

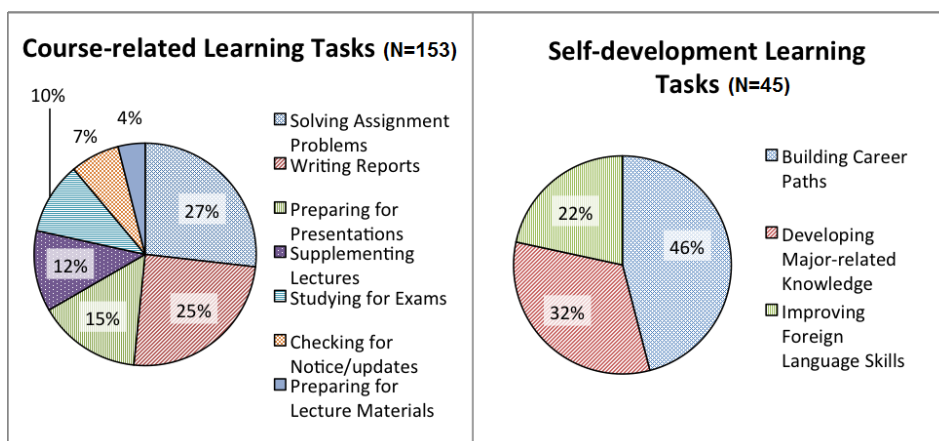
4.2.1 Learning Tasks and Associated Information Needs

Through inductive data analysis and interpretation of the participants' Web diary entries, 7 categories of information needs associated with course-related learning tasks and 4 categories of information needs associated with self-development learning tasks are identified.

77.3% of the total Web tasks were related to the courses students were taking. Information needs associated with solving assignment problems (27%) accounted for the most of the course-related learning tasks, and 25% of the tasks relates to the needs for writing a report as a requirement for a course. The needs associated with preparing for presentations (15%), supplementing their understanding of lecture contents (12%), and studying for exams (10%) also appeared commonly in the course-related learning tasks. The undergraduate participants also desired to be kept updated on the latest announcements of the courses (7%), and 4% of the course-related learning activities were for getting lecture materials prepared, such as downloading the lecture notes from the course website.

Table 10. Inductive categorization of Learning Tasks and Information Needs

Learning Tasks	Learning-related Information Needs	Quotes
Course-related Learning	Checking for Notice/updates	"I wanted to know when the final exam of English class is."
	Preparing for Lecture Materials	"I downloaded yesterday's lecture note that I've sent to myself."
	Supplementing Lectures	"I wanted see the image of <i>Caenorhabditis elegans</i> because the verbal explanation was not enough."
	Studying for Exams	"I searched for some concepts that I cannot understand while going thru the list of words for test prep."
	Solving Assignment Problems	"I searched on how to calculate binary arithmetic to solve a math problem."
	Preparing for Presentations	"I went to Youtube to find a video to put in the presentation"
	Writing Reports	"I wanted to see if there is any work that I can reference on my final paper."
Self-development Learning	Developing Major-related Knowledge	"I was looking for some information on Japanese Democratic Party to write an essay for my academic research society."
	Developing Intellectual-cultural Knowledge	"I regularly check BBC News in order to be updated with the issues around the globe."
	Improving Foreign Language Skills	"I downloaded an open-source lecture to practice conversations in English."
	Building Career Paths	"I wonder if there is anything I can do for the summer vacation, like an internship."

**Figure 12. Occurrences of learning tasks by category**

45, that is 77.3% of the total Web tasks were related to the self-development learning. Such tasks were highly related to the needs for building career paths (38%), such as looking for an internship opportunity or attending a company seminar. The needs for developing major-related knowledge and intellectual-cultural knowledge accounted for 26% and 18% respectively. Moreover, 18% of the participants' tasks were associated with the needs for improving their foreign language skills.

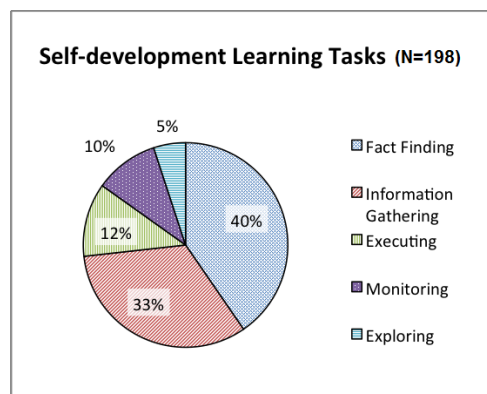
4.2.2 Information Seeking Modes by Information Needs in Learning

Different modes of information seeking were derived deductively from the previous studies on Web information seeking behaviours (Choo, Detlor, & Turnbull, 2000; Morrison, Pirolli, & Card, 2001; Sellen, Murphy, & Shaw, 2002), and some additional categories were inductively identified from the data analysis and interpretation of the participants' Web diary contents.

Fact Finding, Information Gathering, Exploring, Monitoring, and Executing are the five different seeking modes noticeable in the context of learning, and each mode is explained in Table 11 with quotes from the participants' diary entries.

Table 11. Inductive categorization of information seeking Modes in the context of learning

Information Seeking Modes	Description	Quotes
Fact Finding	retrieving some short, specific information, possibly in one short answer	<p>"I looked up what the phrase 'irons in the fire' meant in English."</p> <p>"I was looking for the financial information of Digital Chosun for Accounting assignment."</p>
Information Gathering	collecting enough information on a specific topic; may require multiple pages and overlapping data for confirmation or alternating views on the topic	<p>"I was searching for some tips on using the light equipments for recording a video as a part of an assignment."</p> <p>"I wanted to get some diverse opinion on religious conflicts over the world because I have to write a report about the issue."</p>
Exploring	ludic notion of browsing, where the user is engaged in spontaneous information seeking with no specific goal; the information may be used in the future	<p>"I found this blog of a Computer Science professor with some inspiring posts."</p> <p>"I clicked on this featured article about UX (which is my interest area) that I encountered on the first page of Naver."</p>
Monitoring	repeated visits to one or more Web pages to monitor or check for dynamic information	<p>"I was checking if the professor has uploaded the materials for the next class."</p> <p>"I was looking at the internship board to see if there is anything new posted."</p>
Executing	other learning-related needs that may not exclusively related to information seeking, but requires students to take actions on the web	<p>"I used the Web translator because I had to write an English report."</p> <p>"I went to the class site to submit my assignment due today."</p>

**Figure 13. Occurrences of information seeking modes in learning**

As shown in Figure 13, the mode of fact finding (40%) appeared to be the most common information seeking mode the undergraduate participants take in learning-related Web activities. Information gathering (33%) is another mode that was chosen considerably frequently in the context of learning. The mode of executing, monitoring, and exploring counted for 12%, 10%, and 5% respectively.

Cross tabulation of learning-related information needs and seeking modes (Table 12) indicates how participants employ diverse seeking modes for each information need. The course-related learning tasks associated with the needs for checking notice involved the mode of fact finding (72.7%), and the tasks associated with the needs for lecture preparation involved the mode of executing (83.3%), such as downloading. In relations to the needs to supplement their understanding of lecture contents, the participants employed the mode of fact finding (44.4%) or information gathering (27.8%). The mode of fact finding was also used for 93.8% of tasks related with studying for exam, and 63.4% of tasks related with solving for assignment problems. The latter also involved the mode of information gathering (14.6%) and executing (12.2%). The Web tasks associated with class presentations mostly employed the seeking mode of information gathering (87.0%), and the ones associated with writing reports involved various types of modes,

such as information gathering (55.3%), fact finding (31.6%), and executing (13.2%).

Table 12. Cross-tabulation of Learning-related Information Needs and Information Seeking Modes

Learning Tasks		Information Seeking Behaviour				
		Fact Finding	Information Gathering	Exploring	Monitoring	Executing
Course-related Learning	Checking for Notice	8	0	0	2	1
	Preparing for Lectures	0	1	0	0	5
	Supplementing Lectures	8	5	0	3	2
	Studying for Exams	15	1	0	0	0
	Solving Assignment Problems	26	6	0	4	5
	Preparing for Presentations	1	20	1	0	1
	Writing Reports	12	21	0	0	5
Self-development Learning	Major-related Knowledge	4	5	2	1	0
	Intellectual-cultural Knowledge	0	2	4	2	0
	Foreign Language Skills	4	0	0	1	3
	Building Career Paths	2	4	3	7	1

(High-rated coloured in red)

The learning tasks associated with developing major-related knowledge involved the seeking mode of information gathering (41.7%) and fact finding (33.3%), where the mode of exploring (50.0 %) was observed with the tasks related to developing intellectual-cultural knowledge. The seeking mode of fact finding (50.0%) and executing (37.5%) were employed with tasks in relation to improving foreign language skills, and the mode of

monitoring (41.2%) was used mostly for the Web activates associated with career building.

4.2.3 Actual Uses of Online Information Sources for Learning

The frequency of visits to each source for learning in general is shown in Figure 14. From the fourteen sources identified from the literature review and the preliminary study, search portals (19.1%) with 61 counts was identified as the most visited online information source, and all but 1 person had accessed the most popular and dominating search portal in Korea (i.e. Naver.com) at least once during the collection period.

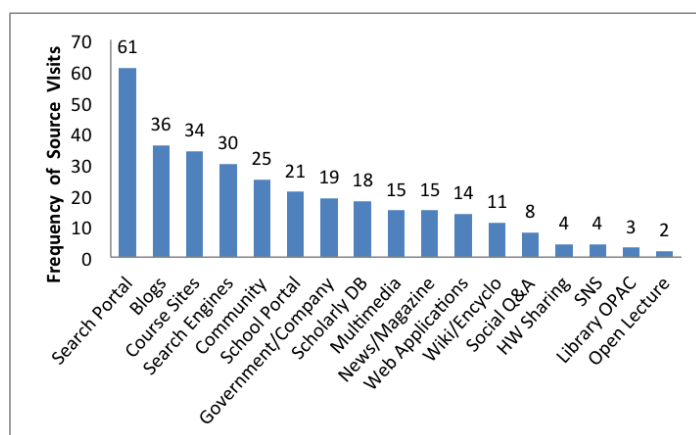


Figure 14. Frequencies of Online Information Source Visits

Blogs (11.3%) and Course Sites (10.6%) were the second and third most visited sources, followed by the foreign search engines. Google had a monopoly in such type of information sources. In other words, all 30 visits of the foreign search engines can be accounted as ‘Google Search’.

Moreover, there were a number of additional types of information sources that were neither recognized from the literature review nor the preliminary studies but were actually utilized by a considerable number of students. 6.6% of the total visits were from the “School Portals”. The school portals does not only contain information directly related to the school or the faculty, such as the academic calendars or course descriptions, but offer a variety of information and services, such as the career centre or the mentoring program to assist students with their college lives from various angles. Another type of sources that appeared in the learning-related information seeking of the undergraduate participants was the official web sites from the government or companies. Students accessing such kind of Web sites were typically looking for the statistical information officially announced by the authority.

The types of online information sources being utilized varied with the different types of information tasks and needs in the context of learning are indicated in Table 13.

It is apparent that search portals are most frequently used regardless of the types of learning tasks or needs. It clearly indicates the participants’ preference on such easily and rapidly accessible information sources. Some participants also indicated that they use search portals in order to gain diverse perspectives and viewpoints on a topic. Participant H10, an

engineering student, stated about his use of search portal as a source of learning various perspectives on current issues:

“Whenever I want to know more about something in the news, I don’t usually go directly to the news sties, but rather start with searching for the issue on the portal. It would not only bring the articles from different news sources but also show blog postings or tweets on the related issue. It broadens my point of view.”

Blogs are also used frequently in addressing information needs associated with course-related learning tasks for the same reason (i.e. to obtain diverse informational perspectives). Blogs are mostly visited when participants wanted to gather a considerate amount of information when completing assignments, presentations and reports. Participant H01, a Nursing student, explained about her experience of using blogs for gathering information on her final report:

“I liked how I could get various opinions on this issue of ‘baby box’.

I learned a lot from reading blog postings with different perspectives.”

Some of the blog users indicated that visually and simply presented information on such sites help their understanding in learning. Participant S05, a Social Science student, stated about his use of the Web in need to supplement his understanding of lecture materials.

“The concept was summarized and well-defined with simple words to the extent of understandable level...indeed, better than the professor’s in-depth, difficult explanation.”

Another source in which the participants tend to consult in course-related learning tasks is the official course site where the professors upload resources and information related to the course materials. Participants mentioned monitoring the course site is the easiest way to get the authoritative and authentic information. Participant S03, an Education student, stated about his experiences with the official course site.

“My professor makes use of this site very well. He uploads useful resources every once few days, and I don’t have to go on my own to search for extra materials for studying. Nothing would be more helpful or authoritative than the ones uploaded by the professor himself.”

For learning tasks related to self-development, it is remarkable that community sites were used frequently with the expectation of obtaining word-of-mouth information through such sources. S09, a Humanity student, explained her experiences with the university’s community site.

“I could get some useful advice and tips about doing an exchange program from senior members in the community.”

Table 13. Frequencies of Visits on Various Online Information Sources by Learning-related Information Needs and Seeking Modes

	S E	S P	M C	S D	L O	W E	C S	O L	S H	N E	C O	B L	Q A	S N	S C	G O	A P
1) Frequencies of Source Visits by Learning-related Information Needs																	
Course-related Learning																	
Checking for Notice	0	0	0	0	0	0	9	0	0	0	0	0	0	0	1	0	1
Preparing for Lectures	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3
Supplementing Lectures	1	8	2	0	1	1	7	0	0	2	2	6	0	0	1	0	0
Studying for Exams	2	7	1	1	0	0	2	0	0	1	2	3	1	0	0	2	0
Solving Assignment Problems	11	14	2	3	1	2	10	2	1	0	2	8	2	0	3	8	4
Preparing Presentation	5	11	3	5	1	3	1	0	1	2	1	7	2	0	0	4	1
Writing Reports	8	14	3	8	0	3	3	0	1	5	1	6	2	1	3	1	3
Sub-Total	27	54	11	17	3	9	34	2	3	10	8	30	7	1	8	15	12
Self-development Learning																	
Major-related Knowledge	1	2	2	1	0	0	0	0	1	2	4	3	0	0	3	1	0
Intellectual-cultural Knowledge	1	3	2	0	0	0	0	0	0	2	0	0	1	0	0	1	0
Foreign Language Skills	1	1	0	0	0	1	0	0	0	0	3	1	0	1	1	1	1
Building Career Paths	0	1	0	0	0	1	0	0	0	0	10	0	0	2	9	1	1
Sub-Total	3	7	4	1	0	2	0	0	1	4	17	4	1	3	13	4	2
2) Frequencies of Source Visits by Information Seeking Modes																	
Fact Finding	18	30	9	5	1	7	14	0	1	4	17	19	5	1	10	15	1
Information Gathering	15	25	6	14	1	5	7	1	4	12	8	16	3	0	5	8	1
Exploring	0	8	0	0	0	1	0	0	0	2	2	2	1	4	1	0	0
Monitoring	0	1	4	0	0	0	8	0	0	0	3	1	0	1	16	0	1
Executing	0	4	0	0	1	0	5	1	0	0	12	0	0	1	2	0	13

4.3 Between the Perceptions and Realities

There were some definite differences in the actual usage rate captured in the log data and the frequency of use that were self-reported and the perceived quality of the learning-related online information sources indicated in the survey responses.

4.3.1 Relations among the Perceived Quality, Perceived Use and the Actual Use

A higher percentage of participants made use of search portals, course sites, and community sites as learning-related information sources than reported in the survey responses (Figure 15).

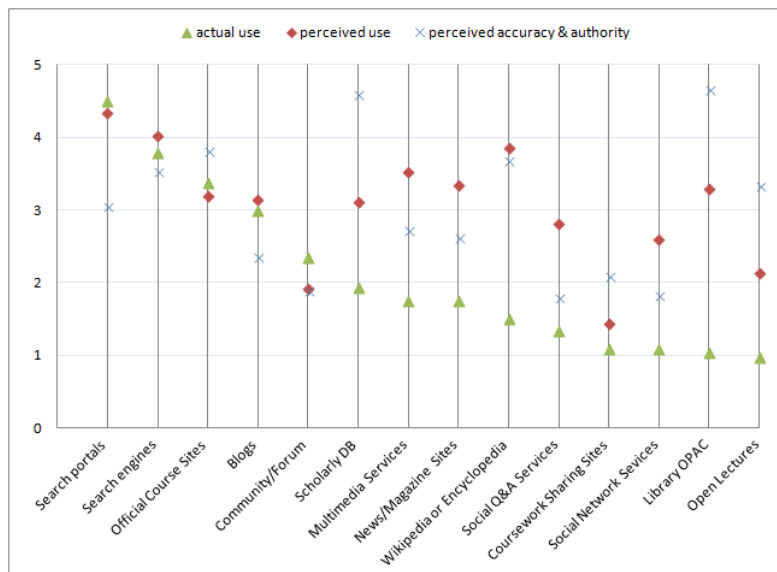


Figure 15. Perceived Quality, Perceived Use and Actual Use of Sources

On the other hand, some sources that were claimed to have relatively high scores of perceived qualities and uses, such as scholarly DB,

Wikipedia/encyclopaedia, library OPAC, and open lecture sites appeared few times in the actual log data of learning-related Web activities.

In the next section, a complete view of undergraduates' perceptions and realities of various online information sources are presented in the topological map, and the rationales for such discrepancy between the reported or perceived use with the actual frequencies of use are explained as well.

4.3.2 Topological Map of Online Information Sources in the Context of Learning

A multi-dimensional scaling map is drawn incorporating the overall frequencies of use, which reflect the perceived use in combination with the actual use, and the overall perceptions of accuracy and authority, which are the two factors of evaluation criteria undergraduate students consider the most important when selecting the learning-related online information sources. The result of the multi-dimensional scaling analysis based on the Euclidean distance methods (stress value < 0.0015) visualizes the topological map of various online information sources for learning (Figure 16).

The sources were classified into four groups by the factors of use frequency and the perceived accuracy & authority: *1) Highly Accurate & Authoritative, and Frequently Used, 2) Highly Accurate & Authoritative, but Less Frequently Used, 3) Less Accurate & Authoritative, and Less*

Frequently Used, 4) Less Accurate & Authoritative, but More Frequently Used.

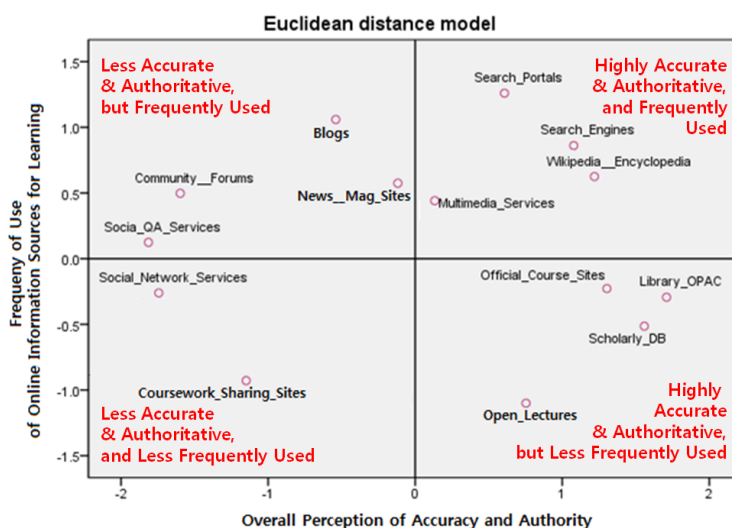


Figure 16. Multi-dimensional Scaling Analysis Representing the Topographical Map of Various Sources

Search portals, search engines and Wikipedia/encyclopaedia are identified to be the frequently selected sources in the context of learning and at the same time, perceived to be highly accurate and authoritative as well. It can be noted that the sources within this category are generally the ones with easy use and rapid accessibility.

Furthermore, it is remarkable that there are some sources that are still being used frequently despite the low scores on perceived accuracy and authority (e.g. blogs, community/forums, and social Q&A services). It may be interpreted that the visualized or simplified presented resources and word-

of-mouth information as well as diverse informational perspectives available in such kinds of information sources has indeed contributed to the high use of those sources for learning overcoming the relatively low scores on perceived qualities and uses.

On the other side, some of the sources are less frequently used even though they are recognized to be highly accurate and authoritative (e.g. library OPAC, scholarly databases, and open lecture services). Although these types of online information sources are recognized for its credibility for providing highly authoritative information for learning, there are several obstacles associated with such services. Some participants indicated discomfort with the unfriendly interfaces or low accessibilities of the websites as many of them require users to install extra programs or plug-ins. There were also concerns regarding the difficulty with language barriers as there lacks educational information and contents, such as the open lectures, freely available in Korean.

5. CONCLUSION

This study started with an objective of investigating undergraduate students' information seeking behaviour with regards to their perception and use of online information sources in the context of learning.

5.1 Summary of Findings

A total of eight research questions and a conceptual framework derived from Leckie, Pettigrew & Sylvian's (1996) Information Seeking Model guided this study. There were four main topics in which the research questions could be categorized accordingly:

1) Perceptions – The evaluation criteria undergraduates identify as important in their selection of online information sources for learning (RQ1), and the perceived qualities and uses of undergraduates in regards to online information sources for learning (RQ2)

2) Realities – Undergraduates' information needs (RQ3), seeking modes (RQ4), and the actual use of online information sources in the context of learning (RQ5)

3) Between the Perceptions and the Realities – Relations among the undergraduates' perceived quality, perceived use and the actual use (RQ6) of various learning-related online information sources for learning and their topographical map in terms of the perceived quality and the use (RQ7)

In order to address the above research questions, both quantitative and qualitative data were collected through conducting a survey and collecting web history logs with semi-structured diary entries. The survey was conducted with a total of 189 undergraduate students at Seoul National University in Seoul, South Korea, and 25 of the survey respondents were selected for the web history data collection phase where a total of 383 source visits related to learning were counted.

Perceptions The result of the survey reveals that the evaluation criteria undergraduate students most valued in their selection of online information sources for learning is the accuracy and the authority of the sources. The study further examines the correlations among the five evaluation criteria where it indicates positive correlations among the factors of authority, accuracy, objectivity, coverage, but negative correlations between the authority and the currency.

The online information sources that are perceived to be most accurate and authoritative are scholarly databases and library OPAC, where the least accurate/authoritative ones are identified to be social network services and social Q&A services. Surveys respondents' reported use of various online information sources indicates that Search portal and engine are perceived to be most frequently used in their learning, followed by Wikipedia/online

encyclopedia, and multimedia content services. The community sites and coursework sharing sites are perceived to be the least-used ones

Realities The results of the Web history logs and the semi-structured diary entries reveal that (domestic) search portals, blogs, official course sites, (foreign) search engines, community sites, and school portals are the ones that are the information sources being used most frequently in the context of learning. Seven different information needs in the category of course-related learning – checking for class notices, lecture preparation, supplementing lectures, studying for exams, solving assignment problems, preparing presentations, and writing reports – and five different information needs in the category of self-development learning – developing major-related knowledge, developing intellectual-cultural knowledge, improving foreign language skills, and building career paths – are identified from the analysis of the web history log and the diary entries.

The information seeking mode employed most frequently during the learning tasks associated with checking for notices is fact finding. The mode of fact finding is also employed most frequently for the Web tasks related to the needs of supplementing lectures, studying for exams, solving assignments and improving foreign language skills. The mode of information gathering is used most frequently for the tasks associated with presentation preparation, report writing and major-related knowledge development. The information

seeking associated with developing intellectual-cultural knowledge involves the mode of exploring, where the ones related to building career paths involves the mode of monitoring.

The types of online information sources being utilized varied according to the information tasks and needs in the context of learning. Official course sites and blogs, along with search portals were the most frequently-used sources for course-related learning tasks in general. School Portals and Community sites are two most frequently visited information sources when the participants were involved in self-development learning.

Between the Perceptions and the Realities There was a high discrepancy between the reported or perceived frequencies of use with the actual frequencies of use captured from the history log. Students made higher use of blogs and community sites for their learning than their reported use. On the other hand, sources such Wikipedia and library OPAC that were claimed to be frequently used did not appear much in the actual log data of learning-related Web activities.

The multi-dimensional scaling analysis of relations between the perceived qualities and the uses of different sources visualizes the topographical map of the undergraduates' perception and use of various online sources in the context of learning. It indicates that some sources, such as library OPAC, scholarly database, and open lectures, are less frequently used although they

are recognized to be highly accurate and authoritative. On the other side, some sources, such as blogs, community sites, and social Q&A services are still being used frequently despite the low scores of perceived accuracy and authority.

Expectations Factors for selecting specific sources identified from the diary entries are presented in order to support the above findings which respond to the research questions. Although it is not explicitly included in the scope of answering the research question, the undergraduates' expectations regarding online information sources in the context of learning are interpreted and summarized as follows: *Ease of Use and Accessibility, Diversity in the Informational Perspectives, Visualized and Simplified Presentation of Information, Acquisition of Authoritative/Professional Information, and Acquisition of Word-of-mouth Information.*

5.2 Implications of the Study

5.2.1 Academic Implications

The research contributes in intensifying the understanding of undergraduate students' online information seeking behaviours in the context of learning, especially within the Korean universities. It offers a detailed view and empirical evidences of undergraduates' real-life information seeking experiences. Also, with continual and rapid developments in the information environment, the study has conducted an investigation on the

new types of information sources emerging, such as blogs and Wikipedia. This study reveals the current picture on the Millennial undergraduates' topographical map of various online information sources in the changing information environment.

Another academic implication of the research is that it provides the basis for the introduction of a new information seeking model, specific to the undergraduate population, which considers the characteristics of their learning-related online information tasks such as the types of information needs and the seeking modes. Although the existing models of information seeking behaviour are still applicable to the undergraduates, they are not designed to address explicitly address the specific characteristics of the population. With the modified version of the theoretical framework employed from the previous study, the current research provides baseline data presenting the influences of information needs and seeking modes on undergraduates' learning-related online information seeking behaviours.

Finally, this research has implications for the use of mixed-methods approach for completely investigating the online information seeking behaviours of undergraduate students. The study employed a triangulated, multi-phase research method which may guide and spark interests among other researchers. The research design, instrument development, and the data collection procedures are described in detail, and it may contribute to the

richness of the growing body of research in the discipline of information science.

5.2.2 Practical Implications

Practical implications include conceptualizing and implementing information services in response to the learning-related information seeking tasks that undergraduates engage in accordance with their information needs and seeking modes in the context of learning.

The research presents empirical findings for the academic information services, such as the school library's OPAC or the scholarly databases, available to the undergraduate students through the Internet in terms of the students' expectations on them – the ease of use, the accessibility, the provision of diverse perspectives, the presentation of visualized/simplified information, and the availability of word-of-mouth information.

The current research highlights the discrepancy among the perceived values and the actual uses of online information sources in the context of learning, and the findings on students' expectations regarding the information sources can explain why they turn out to those particular sources that are more accessible and easily usable, rather than those that are perceived to have a higher qualities for the purpose of learning. The service providers or system designers of the academic information sources may

incorporate those factors in designing the online services and tools to appropriately accommodate the actual needs of undergraduate students in the context of learning.

Moreover, the study points to the need for further development and adjustment in the information literacy training program provided to the undergraduate students. Higher education administrators or professors, in effort to improve students' information skills, may embrace the findings of this research in designing their education programs and curriculums.

5.3 Limitations of the Study

The current research possesses a number of limitations which may lead to suggestions for future research.

There is a definite issue of generalization with regards to the small size of the sample group. Especially the second phase of this study – web history log collection with semi-structured diary – is focused tightly on the experiences of 25 individuals, and the findings may not necessarily represent the undergraduate students, either in terms of the Korean undergraduate population, or the undergraduates of Seoul National University. Due to the relatively small size of the participant group, the findings are intended to be descriptive and indicative, rather than perfectly statistical or probabilistic. This research could be expanded to include a larger, more diverse sample, in which case, the data gathered through observation may apply more strongly.

Regarding the data collection methodology, there is a sense of frustration for not conducting in-person interviews with the participants. As often happens with verbal protocols, participants may not always have explicitly expressed their thoughts on their diary entries. In retrospect, conducting interviews with at least some of the participants following the research activity could have been helpful in clarifying their information needs and factors for selecting specific sources.

Furthermore, since this study focuses primarily on undergraduates' information seeking behaviors specific to the Web environment, it only scratches the surface of how they find and use the information in fulfilling their learning-related needs. Future research may examine other aspects of the learning-related information seeking process with respect to other types of information sources including human resources, such as professors and colleagues, or online tools, such as e-mails or instant messengers that are rather more interpersonal and synchronous. Moreover, the study may further extend to incorporate the latest trends of mobile learning which involves the sources with mobile technologies and smart devices. Such research would provide an extensive picture of the entire information sources of today's undergraduate students.

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Appendix A: Online Survey Questionnaire

학습 관련 웹 탐색 설문

안녕하세요.
서울대학교 융합과학기술대학원 디지털정보융합학과 사용자경험 연구실에서
학습 관련 웹 탐색 연구를 위한 설문을 진행하고 있습니다.

본 설문은 약 10분-15분이 소요될 것으로 예상되며,
여러분들의 소중한 정보는 본 연구목적 이외에 절대로 사용되지 않을 것을 약속드립니다.

문의사항은 snulearning2013@gmail.com으로 이메일 보내주시면 답변드리겠습니다.
감사합니다! ^-^

* Required

Q1. 성별 *

- ☐ 남
☐ 여

기본 정보

Q2. 현재 몇 학기에 재학 중이신가요? *

- ☐ 1학기
☐ 2학기
☐ 3학기
☐ 4학기
☐ 5학기
☐ 6학기
☐ 6학기 이상

Q3. 어느 단과대 소속이신가요? *

- ☐ 인문대
☐ 사회과학대
☐ 자연과학대
☐ 간호대
☐ 경영대
☐ 공과대
☐ 농업생명과학대
☐ 미술대
☐ 법과대
☐ 사범대
☐ 생활과학대
☐ 약학대
☐ 음악대
☐ 의과/수의과대
☐ Other:

웹 이용 현황

Q4. 현재 개인용 PC나 노트북을 소유하고 계신가요? (복수 응답 가능)

- ☐ 본인만 사용하는 PC 소유
☐ 본인만 사용하는 노트북 소유
☐ 타인(가족 등)과 함께 사용하는 PC 소유
☐ 타인(가족 등)과 함께 사용하는 노트북 소유

Q5. 평소 PC나 노트북은 하루에 어느 정도 사용하시나요?

	1시간 미만	1-2시간	2-3시간	3시간 이상
하루 평균	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q6. 학습(수업/자기개발/취업 관련 학습을 모두 포함)을 위한 웹 활동 시간은 어느 정도 되시나요?

	30분 미만	30분-1시간	1-2시간	2시간 이상
하루 평균	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

참가 사례를 보내드릴 전화번호와 이메일을 알려주세요. ^^ *

전화번호

*

이메일

Continue »

학습 활동을 위한 웹 정보 활용

Q7. 활용도 *

평소 학습 활동(수업 예/복습, 과제 수행, 시험 대비)을 위하여 웹 정보를 탐색할 때 아래 사이트들을 어느 정도 활용하시나요?

	매우 자주 사용함	자주 사용함	가끔 사용함	별로 사용하지 않음	전혀 사용하지 않음
해외검색엔진 (예. 구글 통합검색)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
국내검색포털 (예. 네이버/다음 포털)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
멀티미디어검색 (예. 유튜브, 구글 이미지)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
학술검색 (예. 구글 스콜라, RISS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
도서관사이트 (예. 서울대 도서관, 국립중앙도서관)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

수업공식사이트 (예. 교내미러링 사이트, 교수홈페 이지)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
공개강좌/강연 (예. TED, 대학 OCW)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
유료레포트사이 트 (예. 해피캠퍼 스, 레포트)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
뉴스 사이트 (예. 네이버 뉴스, 연 합뉴스)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
포럼/커뮤니티 (예. 클리앙, Apple Developer)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
카페/블로그 (예. 전문가 개인 블로 그)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
소셜 Q&A (예. 지 식in, answers.com)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
소셜 네트워크 (예. 페이스북, 트 위터)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

« Back Continue »

학습 활동을 위한 웹 정보 사이트 평가

아래 설문에서 사용될 용어들에 대해 간단히 설명 드립니다.

- 권위도(authority): 사이트 자체이거나 사이트내 정보의 저작/출판자가 신뢰할만한 권위자인지
- 명확성(accuracy): 사이트내 정보가 출처가 명확하며, 정확한 정보를 전달하고 있는지
- 객관성(objectivity): 사이트내 정보가 저작자의 의도/편향에 치우치지 않고, 객관적으로 검증된 사
실을 다루는지
- 최신성(currency): 사이트에서 이미 오래되어 무효한 정보를 다루지 않고, 최신의 유효한 정보를 전
달하는지
- 포괄성(coverage): 사이트내 정보가 편향된 시각 및 관점을 가지고 있지 않은지, 정보가 문제 및 주
제와 관련된 내용인지

참고: http://www.lib.berkeley.edu/sciences/guides/how_to_evaluate_electronic_resources

정보 평가 척도 *

평소 학습 활동(수업 예/복습, 시험 대비, 과제 수행, 자기 계발)을 위하여 웹 정보를 탐색할 때 사이트
들은 어떤 기준으로 평가하시나요?

	권위도	명확성	객관성	최신성	호환성
1순위	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2순위	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3순위	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

학습 활동을 위한 웹 정보 사이트 인식

평소 학습 활동(수업 예/복습, 과제 수행, 시험 대비)을 위하여 웹 정보를 탐색할 때 접근 가능한 각 사이트들에 여러분의 생각은 어떠한가요?

권위도 *

	5 (매우 권위 있음)	4	3	2	1 (매우 권위 있지 않음)
해외검색엔진 (예. 구글 통합검색)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
국내검색포털 (예. 네이버/다음 포털)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
멀티미디어검색 (예. 유튜브, 구글 이미지)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
학술검색 (예. 구글 스콜라, RISS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
도서관사이트 (예. 서울대 도서관, 국립중앙도서관)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
온라인백과 (예. 위키피디아, 네이버 지식백과)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
수업공식사이트 (예. 교내미러링 사이트, 교수홈페이지)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
공개강좌/강연 (예. TED, 대학 OCW)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
유료레포트사이트 (예. 해피캠퍼스, 레포트)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
뉴스 사이트 (예. 네이버 뉴스, 연합뉴스)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
포럼/커뮤니티 (예. 클리앙, Apple Developer)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
카페/블로그 (예. 전문가 개인 블로그)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
소셜 Q&A (예. 지식in, answers.com)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
소셜 네트워크 (예. 페이스북, 트위터)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

명확성 *

	5 (매우 명확 함)	4	3	2	1 (전혀 명확 하지 않음)
--	-------------	---	---	---	-----------------

(The rest has been omitted)

Appendix B: Guideline for Web History Log Collection and Diary Entry

여러분의 소중한 참여 정말 정말 감사합니다!



앞으로 일주일간
잘 부탁드립니다 ^^

저희는 “대학생들의 학습 관련 웹 탐색 활동”에 대한 연구의 일부분으로서 웹 환경에서 어떠한 자원들이 어떻게 학습에 활용되는지 알아보기 위하여 여러분의 실제 웹 활동을 로그로 살펴보고, 그 중 학습과 관련된 웹 활동에 집중하여 추가 정보를 얻고자 합니다. 다시 한번 참여를 감사드리며, 여러분의 소중한 정보는 본 연구목적 이외에 절대로 사용되지 않을 것을 약속드립니다.

이제부터 아래 과정을 잘 따라주세요! ^^

step 1. Chrome을 포함한 2개의 웹 브라우저 확인/설치하기

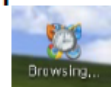
- ① 원래 Chrome과 IE를 사용하고 계신분들은 그대로 써주시면 되구요.
- ② 아직 Chrome이 설치되어있지 않으신 분들은 아래 링크를 클릭하여 설치해주세요.
크롬 설치: <http://www.google.com/intl/ko/chrome/browser/>
- ③ 혹시 웹브라우저가 Chrome밖에 설치되어있지 않으시면 아래 중 1개를 설치해주세요.
IE 설치: <http://windows.microsoft.com/ko-kr/internet-explorer/download-ie>
Firefox 설치: <http://www.mozilla.or.kr/ko/firefox/fx/#desktop>

step 2. Chrome 기존 방문 기록 삭제하기

원래 Chrome을 사용하시던 분들이라면 “ctrl+shift+Delete”를 눌러 인터넷 사용정보, 다운로드 기록삭제, 쿠키 및 기타 사이트, 플러그인 데이터 삭제, 캐시삭제를 선택한 후, 삭제해주세요.

step 3. 웹 브라우저 방문 기록 뷰어 프로그램 설치하기

이메일에 함께 첨부한 “browsinghistoryview.exe” 파일을 다운받은 후, 바탕화면에 옮겨놓으면 준비 완료입니다! ^^



* 사용하시는 컴퓨터/노트북가 2개 이상이신 경우에는 1개의 기기에만 프로그램을 설치 해주시고, 실험 기간동안 최대한 “학습 관련 정보 활동”은 해당 기기에서 부탁드립니다. ^^

step 4. BrowsingHistoryView에서 본인의 웹 활동 확인하기

-

- ③ Visit Time을 클릭하여 가장 최근의 방문 기록이 밑으로 오도록 정렬한 뒤, ctrl-A를 눌러 전체 선택하고 복사(ctrl-C)합니다.

step 5. 구글 엑셀 시트에 본인의 웹 활동 기록하기

- ① 이메일로 보내드린 웹 활동 기록 링크를 열어 하단에 탭 중 해당 날짜를 클릭하세요.
- ② 붙여넣기(ctrl-V)를 눌러 방금 복사한 웹 활동 데이터를 구글 엑셀 시트에 기록합니다.
- ③ 개인정보 및 프라이버시 보호를 위해 연구자에게 노출하기 꺼려지는 데이터는 모두 삭제해서도 좋습니다.

* 데이터 삭제방법

웹 활동 기록 - 손보연 ☆

File Edit View Insert Format Data Tools Form He

fx http://search.naver.com/search.naver?

④ 특정 문구나 아이디 정보가 노출되는 것이 꺼려지는 경우에는 “ctrl+F”를 누른 후, “...” 버튼을 클릭하여 바꾸기 기능을 통해 문구 일괄 변경 가능

① 삭제하기를 원하는 데이터 중 첫번째 줄의 번호 부분을 클릭하여 1줄 전체를 선택

② 키보드에서 shift 버튼과 함께 아래화살표 버튼을 눌러 삭제를 원하는 데이터 전체 선택

③ 선택된 부분을 오른쪽 클릭한 후 Delete rows를 눌러 삭제

Visited	Web-browser
13	Internet Explorer
1	Internet Explorer
1	Internet Explorer
5	Internet Explorer
9	Internet Explorer
9	Internet Explorer
1	Internet Explorer

Delete rows 52 - 58
Clear rows 52 - 58
Hide rows 52 - 58
Resize rows 52 - 58...

* 또한, step 4에서 BrowsingHistoryView 프로그램을 실행하기 전 브라우저 자체에서 삭제할 수도 있습니다. (전체 기록이 삭제되지 않도록 주의해주세요 ^^)

Internet Explorer: “ctrl+H”를 눌러 날짜 클릭 후, 사이트 별로 삭제 가능

Chrome: “ctrl+H”를 눌러 각 기록의 왼쪽 빈칸 선택 후, “선택한 항목 삭제” 가능

사실은 세세한 사이트 주소나 제목, 검색 내용들은 살펴보기 않기 때문에 (참여자분들 모두 모으면 데이터가 너무 많아 살펴보기도 힘들답니다 ㅠ.ㅠ) 프라이버시 보호는 걱정하지 않으셔도 되지만, 만약을 위해 알려드리는 팁입니다!



국문초록

디지털 기술의 발달과 정보의 증가와 함께 현시대의 대학생들에게 지식 및 정보의 개발과 접근 그리고 이를 활용하는 능력은 중요한 경쟁력이 되고 있다. 웹과 함께 자라 온 오늘날의 대학생들은 학습과 관련된 요구를 충족하기 위하여 다양한 종류의 온라인 정보원에 쉽고 빠르게 접근할 수 있지만, 온라인 상 정보의 범람은 오히려 학생들이 원하는 양질의 정보를 찾고, 평가하고, 선택하는 데에 방해가 되기도 한다. 학생들이 학습에 적절한 정보를 습득하고, 이를 위한 최적의 정보원을 선택할 수 있도록 돕기 위한 정보활용교육 등의 노력에도 불구하고 그들은 여전히 학습 관련 요구에 적합한 정보원을 찾기 보다는 평소에 선호하거나 접근이 용이한 정보원에만 의지하고 있다. 이러한 웹 환경에서 대학생들의 정보추구행동에 대한 이해를 넓히고 인정하기 위하여 본 연구는 학습에서의 온라인 정보원에 대한 학생들의 인식과 실제에 대해 알아보고자 한다.

주요어 : 온라인 정보원, 정보추구, 학습, 대학생

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